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MANDIBULAR POSITION AND THE PARTIAL DENTURE

By CHARLES H. JAMIESON, D.D.S., Detroit, Mich.

A NEW era in dentistry was begun when a study of the so-called "closed bite," hereinafter referred to as closed relation, and its associated problems was brought to the attention of the profession by George S. Monson. His ideas were accepted by but a small group of men, who then began to work out his theories in a practical way. The profession as a whole did not accept Monson's theory, but gradually the consideration of the closed relation has come to be a necessary and important phase of dental practice.

The correction of the closed relation has today become an established part of reconstructive dentistry and must therefore be considered and applied in mouths both edentulous and semi-edentulous. In the many combinations of deformities found, the partial denture provides an important means of restoration, not only in use with a complete denture, but also in connection with restoration of remaining natural teeth. To secure harmony and balance of associated dental units, the restoration which more nearly approaches the normal is that which restores lost function and structure with equal attention to the teeth and edentulous areas present.

We have come to recognize the close association and interrelation of all parts of the dental mechanism and can no longer consider the individual tooth without due regard to surrounding and correlated structures, such as its investing tissues, the tongue, the muscles of mastication and expression, the salivary glands and the temporomandibular joint. As late as two decades ago, dentists as a whole did not associate disturbances of physiologic function of these structures with the teeth, and we are but now beginning to grasp the fundamentals of the pioneer work done by Monson, Prentiss, Wright, Bird and others.

While the earlier work on this subject was done in the field of full denture prosthesis, it was not long before its influence spread to crown and bridge and partial denture prosthesis, as technics were developed where treatment of such cases was required. As is usually true

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in the development of new technics, many were tried and discarded and other technics followed as results proved the tests of theories.

Each of us is confronted in the field of prosthesis with the need of replacement of teeth lost in various segments of the arches, either separately or in combination with the correction of the occlusion of the remaining natural teeth. The partial denture provides a most acceptable means for correction and maintenance of vertical dimension, but when it is so employed, the problem of mandibular position becomes a factor.

In modern dental diagnosis, roentgenograms of all teeth and supporting structures are indispensable, and when a change in vertical dimension is contemplated, temporomandibular roentgenograms are also advised. While many condylar roentgenograms are disappointing from the standpoint of diagnosis, the standardizing of the technics by Higley, Maves, Gillis and others, with the laminagraph, as advocated by Bleiker, is producing roentgenograms of this area that have greater diagnostic value.

Facial masks made prior to treatment of extreme cases, when a marked change in facial contour is contemplated, provide a permanent record of value to the dentist and patient alike.

A requisite for diagnosis is an accurate hydrocolloid impression of both maxillary and mandibular arches and transfer of the casts to a diagnostic instrument by means of the facebow. The mounting must then be checked in all ranges of movement to verify its accuracy. The casts must follow the facets as worn on the opposing natural teeth. Then the ear test is made to determine the amount of condylar retrusion. This is done with the little fingers of the operator in the external auditory meatuses and the thumbs on the forehead. In closed relation, the condyle heads can readily be felt during mandibular movements.

Layers of wax are inserted between the teeth and the ear test is continued until extreme condylar thrust is relieved with the teeth occluding against the inserted wax strips. A check-bite taken in this position is then transferred to the mounted casts and the articulator is set to this opening. This new relation is then further studied to determine whether the available structures can be expected to support this opening or the digital and roentgenographic examination will require a compromise as to this position.

It has been said by those unfamiliar with the fundamentals in the restoration of vertical dimension that the determination of the degree of correction is entirely guesswork. There should be no more justification for this remark than if it referred to a cavity preparation for a gold inlay, unless the operator were as unfamiliar with the anatomy of the parts involved.

A plan of reconstruction which is the result of thorough diagnosis and consideration of the factors involved is dependent on the judgment of the operator and not on his adeptness in guessing. Judgment is defined as the faculty of coming to a conclusion which is, in all probability, right. Guesswork is the result of working with an opinion formed on slight or defective evidence as a basis. Guesswork need play no part in the reconstructive plan of the thorough operator. If a case does not present sufficient evidence to warrant opening the bite, the thorough operator will not employ this procedure in his reconstruction.

This evidence relates in part to mandibular position, and this demands our study from both the diagnostic and the corrective point of view. Suspended as it is by the masticatory musculature, and being permitted great freedom of movement through the temporomandibular articulation, the mandible is subject to much greater change of structure than is its opponent, the maxillae. Its positional relation as a movable unit of the skull is influenced to a degree not possible in the fixed maxillae. Thus, the

mandible is subject to structural and positional change, the maxilla to structural change only.

These changes have as their bases the occlusion of the teeth and are in direct proportion to the degree of retrogression of the occlusion. It is logical to find that the individual who has reached the height of physical development in symmetry and form will have good occlusion and correct mandibular relation. With the advent of disturbing factors of environment, habit, loss of teeth, abrasion and faulty metabolism, the breakdown begins, and retrogression from the normal to the abnormal is inaugurated. Thus are developed the deformities or abnormalities which come to us for treatment.

TYPES OF DEFORMITIES

Different types of deformities will be found in studying mounted casts of cases under consideration. A broad classification of these can well be made, although there are many types which blend from one classification to another. Three classes, however, are evident.

Class 1. Horizontal and vertical overbite types.

A. With marked vertical, but little horizontal overbite. This type is nearly ideal in the original, but considerable closure results from excessive wear and loss of teeth. The upper and lower incisors show marked wear, and often the posterior teeth, especially the bicuspids, are intruded owing to excessive and unbalanced stresses.

B. With marked horizontal and vertical overbite. This type of deformity is the result of non-development of the mandible with its corresponding constriction of lateral maxillary development. Little wear is evident except on the second molars.

Class II. End to end types.

Presents vertical closure only. Excessive wear is evident, and since the lines of vertical stress are usually unaffected, the normal arch form is maintained.

Class III. Prognathous types.

A. Congenital and developmental. A prognathous condition may be produced in the child through hereditary influence and improper development. If not treated, this condition is perpetuated in the adult.

B. Acquired. A prognathous condition may be acquired through wear, excessive function and loss of teeth, even though the condition before mutilation was nearly ideal.

In all of these deformities, malocclusion is evident. In lateral ranges of movement, a few teeth assume all the stress that in normal occlusion should be equally distributed. The efficiency of the ideal occlusion is lost, and only the simple opening and closing movements of centric occlusion are present. The abnormal overbite so often found restricts the lateral and protrusive ranges of movement, and unless balance is established in all ranges and stresses are correctly applied, restorations which perpetuate these deformities will fail. These failures have too often been ascribed to the types of abutments and attachments. They are usually the result of a lack of understanding of the action of mastication as a whole. The problem does not resolve itself into a study of individual units in restoration, but rather of all the teeth in their various positional relations to each other, and the influence they exert upon the physiologic action of adjacent and coordinating structures.

This classification of deformities can be applied to denture construction as well as to any other type of mouth reconstruction. However, for partial dentures in particular, a further grouping can be made, which considers the edentulous areas of the mouth. Kennedy provides the following classification:

I. Saddle, bilateral and posterior to attached teeth.

II. Saddle, unilateral and posterior to attached teeth, all teeth remaining on one side, and all teeth missing on the other.

III. Saddle having both anterior and posterior support, and all teeth missing on one side.

IV. Saddle entirely anterior to attachments.

In combining this classification with that of deformities, for the correction of the closed relation, reconstruction may be instituted on the maxillae only, on the mandible only or on both, depending on diagnostic factors. Any of these may be found in combination and frequently associated with a full maxillary denture. The use of the full mandibular denture with a partial maxillary denture is usually not advised because of unfavorable factors in the diagnosis of this type of case.

In consideration of treatment of these deformities, Class I (A), with marked vertical, but little horizontal overbite, is probably the most common. This type responds readily to reconstruction both anatomically and physiologically. However, there is one type which differs from most in this classification and which does not respond so readily to treatment. I refer to great vertical, but little horizontal overbite with little wear on the teeth but evidence that the closure is congenital. This type presents difficulties in treatment, particularly if attempted when the patient is past maturity.

We are tempted to hasten treatment of this type because of the improvement we can foresee in facial expression by a balance of facial proportions. Opening of the bite here means increasing the length of the muscles of mastication, resulting in a stretching of these muscle fibers often beyond their tolerance.

Particularly is this true of the external pterygoid muscle. Attached as it is to the capsule of the temporomandibular joint, a stretching of this muscle pulls the disk from its normal position on the head of the condyle. Mandibular movements then following this change in position provide abnormal contacts between the condyle and the fossa. This frequently results in pain and soreness of the joint, and a definite "cracking" when a certain degree of opening is reached.

In this instance, it is my belief, the disturbance is the result of an attempt to correct a congenital condition. If treatment is instituted in the child, success is possible, but failure often results when the adult receives treatment.

It is true, of course, that in these congenital closed relation cases, further closure can result through loss of teeth or excessive abrasion as age advances. It is then entirely advisable to restore this lost dimension, only, however, to the minimum. This amount is determined by computation of the amount of occlusal wear, and by finger tests in the external auditory meatuses for condyle encroachment. Temporary splints should also be constructed to determine the degree of opening before permanent restorations are completed.

The second division under Class I deformities is that with marked horizontal and vertical overbites, the result of impaired development. In this type, splints are frequently necessary to secure proper development and an anatomic relationship, assisted in some instances by orthodontic treatment.

Class II, a simple closure due to abrasion of the end-to-end type of occlusion, is an acquired condition which responds readily to immediate reconstruction when the normal relationship is restored, and partial dentures constructed for this type function most efficiently.

Class III deformities are prognathous and of two divisions, the first congenital and developmental. This is always a case for treatment and usually requires an extended period of time. Frequently, in conjunction with orthodontic treatment, it is possible to produce change in the angle of the mandible and a harmonious facial dimension through application of stress that will counteract the deforming force.

The second division of the Class III prognathous type is the acquired deformity, brought about by abrasion, excessive function and loss of teeth. This

type responds to immediate reconstruction, the patient accepting the correct relationship with little or no discomfort.

The acquired closed relation case is more common than the congenital type and presents less difficulty in treatment. Progressive as it is, the degree of closure from the normal increases from youth through middle age to advanced age, and in youth we are able to recognize conditions predisposing to closure, as the nature of the occlusion indicates the trend. The tapering type of arch, with its accompanying deep overbite, is the forerunner of the closed relation. While by no means limited to the tapering type, it is, I believe, here most often found.

The breakdown of the occlusion usually begins with the loss of the mandibular first molar. If this tooth is not replaced, the normal mesiodistal measurement is decreased, the mandibular incisors begin to tip lingually, the maxillary incisors begin to fan out labially and the retrogressive process advances.

DEFLECTION OF THE MANDIBLE

As the tendency to closure progresses throughout life, loss of teeth, abrasion and resultant masticatory habits frequently result in a lateral deflection of the mandible from the normal sagittal plane. In any of the three classes of deformities, there may be deflection, the degree being dependent on the extent to which these causative factors have progressed. If a unilateral habit has developed in mastication, the deflection is toward the working side rather than the balancing side. The condyle on the working side is retruded in its position in the fossa and has a limited excursive movement. The condyle of the balancing side has developed a greater freedom of movement and, in cases of extensive closure, will move well forward upon the articular eminence or beyond.

Riesner writes:

> A roentgenographic check-up will show that the condyle of the side selected for mastication has been injured or crippled. This is easily understood when we consider the physiology of the musculature of the region. The external pterygoids initiate and control lateral jaw thrusts in eccentric relation. If the insertion of one side is disturbed through injury, or impairment or atrophy of the muscles through disuse, the mandibular condyle head of that side will not execute the normal physiologic action, and a lateral eccentric thrust to the opposite side cannot be practiced without severe pain or discomfort, if it is accomplished at all.

The important factor in treatment of mandibular deflection associated with the closed relation is the restoration of balance to all anatomic parts concerned. Bird writes:

> A study of muscles of mastication clearly reveals Nature's design for balance and implies the necessity for its maintenance. Upon balance depends the normal function of adjacent structures, the preservation of which is determined by the character and position of the occlusion of the teeth. Opening a closed bite to a better functioning relationship permits the establishing of balanced occlusion. We thereby remove the deforming force, and create the stimulus which puts into operation the opposite or corrective force.

The cause of deflection is unbalanced occlusion, and, if treated by restoration of lost function, and with the path cleared for return to its normal sagittal relation, mandibular deflection is practically self-corrective.

Lowery affirms that when the forces exerted by the muscles of mastication are coordinated, their resultant action or force results in facial balance and symmetry.

FUNCTION OF SWALLOWING

Abnormal mandibular position as associated with the closed relation causes physiologic disturbances far-reaching in effect. In an individual presenting a well-balanced occlusion, anatomic, physiologic and mechanical balance provides normal health of the associated struc-

tures. There is proper drainage of nasal and pharyngeal areas, salivary glands and eustachian tubes, largely dependent on the stimulation secured through deglutition. The importance of complete function in the act of swallowing must be emphasized. Swallowing produces a negative pressure or suction, which has a particularly stimulating effect upon the oral tissues and structures.

Most of us are, through habit, "lazy swallowers," and swallowing without some effort does not produce the negative pressure necessary to secure adequate drainage of oral structures, including the salivary glands. These, in turn, do not provide the needed fluids to assist in digestion.

The closed relation is a primary factor in a decrease in the function of deglutition. It has been shown that for every quarter inch loss in vertical dimension, there is a loss of one cubic inch total content of the oral cavity. This decrease in cubic content is marked by the tongue's being forced back into the throat area and limited in movement during deglutition.

In the embryologic development of the digestive tract, the function of swallowing is one of the first processes to be correlated. During this development, the muscles associated with swallowing, sucking and chewing are integrating, and reciprocity between the muscles associated with these processes is necessary in speech, in consonantal and vowel production.

Muyskens states that the speech process is not a function of the mind, but of the anatomic parts associated with chewing, sucking and swallowing. The work done in research on speech has tended to place more stress on the act of swallowing as related to the speech process than dentists are aware. Just as valving in the larynx is related to movements of the tongue, a distal displacement of the tongue caused by excessive closure of the intra-oral space will have its effect on speech.

The act of swallowing also provides the negative pressure which effects drainage of the eustachian tubes. We know that a decrease in distance between the origin and insertion of a muscle interferes with its normal function. A reduction of the vertical dimension thus affects in function the tensor veli palatini and the levator palatini muscles. These muscles have their origin in the cartilaginous portion of the eustachian tube and their insertion in the soft palate. Because of failure of these muscles to function properly, from laxity in swallowing, there is not sufficient stimulation for complete drainage of the tube.

EFFECT ON HEARING

The effect of loss of vertical dimension on the temporomandibular joint and the organ of hearing has received much prominence in recent medical literature following the pioneering work of the dental profession. The work of Costen has been particularly helpful in interesting men in the field of otolaryngology in our mutual problem.

It is now generally accepted that malposition of the condyle in the glenoid fossa can cause deafness and other disturbances of function. Most investigators have ascribed the direct cause to pressure of the condyle head upon the auriculotemporal nerve as it emerges from the petrotympanic fissure. Bleiker, of St. Louis University, and Strong, of the University of Michigan, have concluded, from their work in this field, that the *chorda tympani* nerve and the anterior tympanic artery are more apt to be the first structures affected. As this nerve and this artery emerge from the petrotympanic fissure, they bear a closer relationship to the functioning condyle head than does the auriculotemporal nerve. The anterior tympanic artery, a branch of the internal maxillary artery, provides the blood supply to the tympanic membrane. If function of this artery is interfered with, malfunction may result in otosclerotic deafness.

Any disturbance of the chorda tympani nerve affects the secretory functions of the sublingual and submaxillary glands, and may result in the condition of dry mouth frequently encountered. This phase of the temporomandibular problem demands more research. Work on this problem, such as that reported by Harris in the dissection of more than 100 pairs of condyles, will add much toward a clearer understanding of this subject.

PALATAL COVERAGE

In the treatment of mandibular position through partial dentures, there are several points in the consideration of palatal coverage which contribute materially to the success of the case. When the palatal surface is normal or near normal, i.e., when no osseous prominences or unusual distribution of tissue is noted, it is often advisable to cover a portion of the palate sufficient to provide the stimulation of contact, to assist in support of the base. For example, a broad, flat palatal arch placed just anterior to the junction of the hard and soft palate will provide a tissue seal with adhesion to assist in retention and stability. This type equalizes the pressure on ridge and palate and is advocated when there is no distal tooth-borne attachment.

The broader flat palatal area of the denture has a further advantage in that it is much less annoying to the tongue than is a thicker, narrower bar placed more anteriorly. An attempt should be made wherever possible to avoid placing thick bars or connectors over the anterior palatal area. Sensitivity tests of various portions of the tongue have shown that the tip of the tongue is many times more sensitive to pressure stimuli than are the lateral margins and the dorsum. The tip of the tongue can readily detect each of the two points of dividers spaced 2 mm. apart. Proceeding distally, the dividers must be spaced from 2 to 4, 6, 8 or often 12 mm. on the extreme distal and dorsal portions of the tongue to detect each of the two points. This simple test should prove to us the importance of limiting anterior palatal coverage.

Inhibitions to speech are often evident when this phase of palatal design is overlooked. Particularly is this true of the anterior tongue position in the enunciation of the consonants t, d and n and the sibilants s and z, when the tip of the tongue contacts the lingual surfaces of the upper incisors.

BASE MATERIALS

Partial dentures constructed in the treatment of closed relation cases are naturally heavier than those constructed for cases in which this technic is not employed. In many instances, the degree of opening is such that metal bases are contraindicated.

The introduction of the acrylic resins to prosthetic practice provided base material which, to my mind, supersedes the metals as the base material of choice. Its ease of rebasing makes possible the insertion of partial dentures immediately after extraction with the assurance that ridge contacts can be corrected as resorption progresses. The functional stimulation known to follow the immediate insertion of full dentures is of just as much value in the partial denture field, and should be more widely employed. The tendency to excessive resorption is thus minimized and esthetic values can be maintained.

Current writers on the subject of the closed relation occasionally remind us of the dangers arising from promiscuous treatment by increasing the vertical dimension. Many of these points are apropos, and discretion must always be the brake upon the wheel of enthusiasm. A plea for conservative treatment will assist greatly in widening the scope of treatment and in avoiding the stigma of fadism being applied to a proved therapy through sincere but misguided application.

Each and all of the factors involved in loss of vertical dimension and its

subsequent restoration are definitely a part of the partial denture practice of today, and we must correlate the physiologic, anatomic and mechanical phases of practice in order to render better health service to our patients.

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OBSERVATIONS IN THE PHARMACOLOGY OF PROCAINE AND OTHER DRUGS

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FOLLOWING the injection of procaine solution for the extraction of teeth, especially from the lower or mandibular arch, occasionally some of the local anesthetic comes in contact with the lingual nerve. In such cases, the patient may experience a peculiar feeling on the side of the tongue nearest the point of injection. Upon inquiry, it is generally agreed that the feeling is similar to that experienced when one's foot or some other part of the body is apparently "going to sleep." This condition is sometimes referred to by the patient as a feeling of "pins and needles" or a "tingling" sensation.

These observations warranted further investigation in the pharmacology of procaine. Other drugs or chemicals that might be included in this phase of research, and for comparison, are cocaine, nicotine, etner, nitrous oxide, hypnotics and atropine.

We know that cocaine is a nerve-paralyzing agent, yet it has been administered, especially by habitués, for its stimulating properties. A point of interest that might be here mentioned is a sensitizing reaction from cocaine injection. This is best demonstrated by recording the action, on blood pressure, of similar amounts of epinephrine solution both before and after the injection of a small amount of cocaine. The same peculiar sensitizing action is also produced with procaine. (Fig. 1.)

In this experiment, 0.5 cc. of an epinephrine solution (1:25,000) was injected into the vein of a dog. The resulting blood pressure rise, as recorded at A, was used as a control. At B, a second injection of 0.5 cc. of the epinephrine solution was made shortly after the injection of 0.5 cc. of a 1 per cent procaine solution.

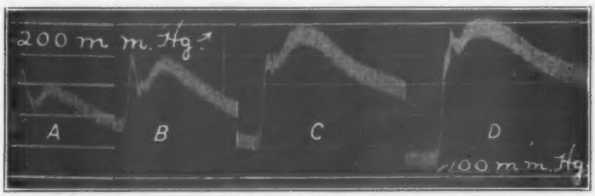

Fig. 1.—Effect on blood pressure of dog of injection of similar amounts of epinephrine (0.5 cc. of 1:25,000 solution) both before and after injection of procaine solution (1 per cent).

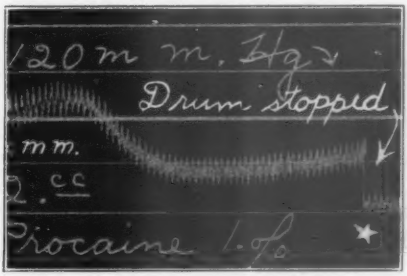

Fig. 2.—Effect on blood pressure of dog of repeated injection of similar amounts of nicotine solution.

At C, a third injection of 0.5 cc. of the epinephrine solution was made shortly after an injection of 1 cc. of the 1 per cent procaine solution. At D, a fourth injection of 0.5 cc. of an epinephrine solution was made and again, shortly after, another 1 cc. of the 1 per cent procaine solution was injected.

Nicotine is an excellent laboratory drug for demonstrating stimulation before the onset of paralysis. The action of nicotine is, however, on the ganglia. Its stimulating properties are best observed on the blood pressure. Figure 2 shows the effect of three separate injections of a similar amount of a 0.1 per cent nicotine solution on the blood pressure of a dog. It will be noted that the first injection (A) caused the greatest rise in blood pressure. The second injection (B) indicated the presence of a partial paralysis. The third injection (C) indicated a complete paralysis. If the same nicotine solution is applied to a segment of an isolated but intact nerve, it has little or no apparent effect in blocking mechanical or electrical stimuli. If, however, the nicotine solution is applied on a ganglion cell, a complete blocking of impulses is observed, and in a relatively short time.

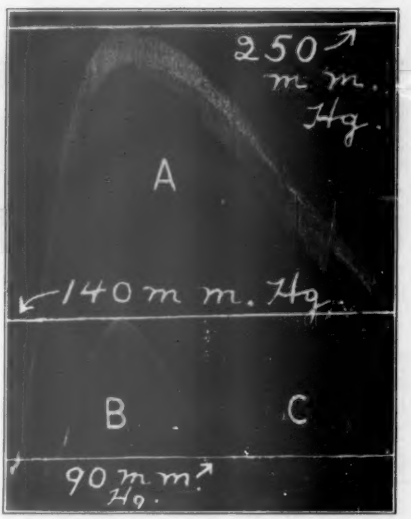

Fig. 3.—Effect on blood pressure of dog of injection of procaine in region of cord.

We often refer to four stages of ether anesthesia, the fourth stage being com-

plete or bulboparalysis. Leading up to this stage are a stage of analgesia and a stage of excitement. When nitrous oxide is administered, we may again observe various types of excitement prior to the anesthesia stage. In the case of hypnotics, it is not uncommon to see animals moving about as if trying to resist the hypnotic effects.

In frogs, injection of curara causes paralysis at the myoneural junction. If curara is applied to the spinal cord, marked stimulation may result. In comparison, procaine injection causes paralysis of the nerves or nerve endings without any apparent noticeable changes. If procaine is applied to the spinal cord of an anesthetized dog, the dog's tail may wag for a short time following the injection. When procaine has been injected around the cord, a slight rise in blood pressure may occur, followed by a gradual fall. (Fig. 3.)

When small doses of atropine are given, there is a slowing of the pulse, due to a stimulation of the vagus center. In addition, atropine acts on the central nervous system, stimulating first the medullary center and later the motor areas of the cortex. Toxic doses eventually paralyze the central nervous system. In comparison, procaine stimulates before paralyzing some centers of the brain at least. (Fig. 4.)

In this experiment, an injection of 0.5 cc. of a procaine solution was made into the fourth ventricle of a dog. This injection stimulated the respiratory centers, a depression of the respiration following. There was also an increase in heart rate and a general rise in blood pressure, followed by a decrease in heart rate and a gradual fall in blood pressure. In making injections into the fourth ventricle, extreme care must be exercised after establishing the proper landmarks. A mechanical stimulus or injury to tissue cells may lead to wrong interpretation.

CONCLUSIONS

Numerous observations on both human beings and animals point, generally speaking, to a definite stimulation or stages of excitement associated with drugs or other agents the purpose of which is to paralyze. I am inclined to believe that this reaction of stimulation or excitement is in reality an evidence of tissue resistance. This power of tissue resistance can be greatly increased, and, in such cases, it is often referred to as tissue tolerance. The concentration of the drugs or chemicals employed and the amount administered, and the rapidity of absorption, are to be considered in this type of investigation.

Fig. 4.—Effect on blood pressure of dog of injection into fourth ventricle of 0.5 cc. of 1 per cent procaine solution.

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A STUDY OF THE LOCAL ORAL EFFECT OF DIET ON THE PERIODONTAL TISSUES AND THE GINGIVAL CAPILLARY STRUCTURE*

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INTRODUCTION

WITH the years, the numerous attempts to study the relationship between nutrition, and caries and periodontal disease have produced an extensive literature on this subject. The weight of evidence does not yet clearly establish any single specific nutritional substance or group of such specific substances as the sole forces in the initiation of these disorders. The effects of diet are so frequently viewed through their nutritional aspects that there is a definite tendency to lose sight of the important actions of and influences which may be exerted by foods locally in the mouth. The distinction should be noted between the term "nutrition," referring to effects after absorption and assimilation, and the term "diet," referring to both the direct local oral effect and the systemic effect of the food intake.

While recognition has been accorded the rôle of diet in the general consideration of the etiology of periodontal disturbances and dental caries, the need for fundamental research in this study remains. An attempt has been made to investigate the oral gingival changes following two distinct types of dietary régimes: 1. The strongly detergent, attrition-producing diet. 2. The predominantly non-detergent, soft food diet.

Caries received no special attention except to be noted for its occurrence or non-occurrence. Representative examples of types of changes will be included in this report.

METHOD OF INVESTIGATION AND CHOICE OF PATIENTS

Capillary microscopy affords a method for direct examination of the capillary blood vessels *in vivo*. The health and physiologic functioning of an organ or part of an organ are dependent on its circulatory system; i.e., the supply of oxygen and elements for anabolism, and the removal of waste matter, the products of catabolism. Colloidal protoplasmic interchange is effected by the capillary and structures through the medium of the lymph. Interference with health of a given area may be manifested by change in the circulation as evidenced by changes in the capillary structure and tonus. Successful adaptation of the capillariscope to the study of the gingival tissues has permitted the use of this technic in the investigation.

An extensive examination of the gingival capillaries in a series of periodontia patients at New York University College of Dentistry indicated the significant changes occurring with the two diametrically opposed types of diets. The recording of the form and size of the

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superficial capillary structures of the gingival tissues by means of direct photomicrographs was attempted in order to overcome the difficulties inherent in camera lucida drawings. Not only would it be extremely difficult to maintain immobility for a period of time sufficient to permit repeated observations in a given field, but also the factor of personal interpretation lays drawings open to justifiable criticism. The photographic method, of course, assures an exact reproduction.

Fig. 1.—Capillary microscope employed for direct observation and photomicrographs of capillary blood vessels in gingival tissues.

Recourse was had to an established method of gingival tissue study; namely, biopsy, to check and substantiate the *in vivo* capillary findings. Photomicrographs of the biopsy sections of each case will be shown. Such pathologic examination permits inspection of the collagen formation and distribution in addition to examination of the capillary structure. A gingival papilla taken as typical of the tissues of the anterior part of the mouth was chosen for sectioning in each case.

The most important factor in the choice of the cases studied was the dietary history, considering the diet as either strongly detergent or definitely non-detergent. The clinical examination of the periodontium and teeth was important. The exclusion of other possible etiologic factors which may have led to the given condition was effected by means of a blood count, urinalysis, etc., or, where indicated, by a complete physical examination.

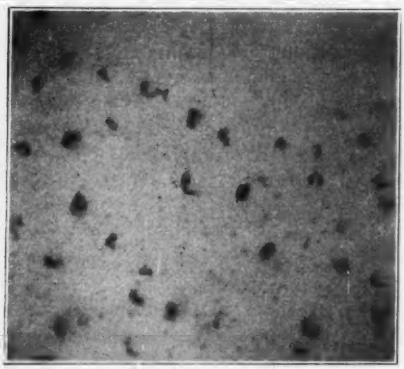

Fig. 2.—Photomicrograph of gingival capillaries found typical of cases of normal gingival tissue as taken with apparatus shown in Figure 1. The even distribution of the capillaries, the small viewable length of the arterial and venous limbs and the small hairpin-like bend of the capillaries are evident.

CAPILLAROSCOPY

One of the earliest attempts at direct *in vivo* examination of human capillaries was made by Heuter,[1] who reported pathologic changes in the capillaries of the lower lip in various infectious diseases. The normal capillary picture is described by Fisher.[2] Because of ease of access and relative superficiality of the vessels, efforts have been made in the study of the capillaries of the human nail bed and the inner surfaces of the

lower lip in relation to various perplexing disease processes.[3] Correlation between changes in the capillaries of the lip mucosa and periodontal disturbances has been attempted by Citron,[4] who reports that approximately 80 per cent of patients with periodontal disease show developmental defects in the microscopic capillary picture in the region, together with impairment in the nourishment and metabolism of the mucosa, and a greater liability to definite disease processes. Direct study of the capillary structure in marginal periodontitis has been reported by Wikblad,[5] who was able to distinguish changes on the basis of exogenous and endogenous etiology.

Kolb,[6] in a photomicrographic study

Fig. 3.—Teeth of man, aged 47, showing well-hornified gingival tissues and relative freedom from calculus deposition. The oral hygiene was poor, but the patient had employed a detergent diet for many years.

of capillaries, found no similarity between the capillary forms of the fingernail bed and those of the lip. An adaptation of the Loos classification of capillary forms permitted him to find a similarity between the capillaries of the gingiva and those of the lip, but distinctions as to particular capillary forms in the various periodontal disturbances could not be made. Oral diabetic changes have been related to stasis or slowing of the blood stream caused by a dilation of the capillaries. This dilation is held to be due to an increase in sugar content of the tissues.[7] According to Krogh,[8] Gänsslen (1927) reports a change in human skin capillaries brought about by the character of the diet.

An excellent description and classification of capillary changes in the gingival tissues appears in the work of Back and Redisch.[9] By means of capillary microscopy, they were able to distinguish five types of gingival capillaries, briefly described as follows:

1. The normal picture, in which the small blood vessels are evenly and regularly distributed.

2. The gingival conditions due to an endocrine background (especially of a gonadal type). The capillaries are irregular, twisted and unevenly distributed.

3. In gingival disturbances of an inflammatory nature, the capillaries and their networks thoroughly filled and widened and appearing enlarged.

4. The picture of avitaminosis, typically showing the capillaries stuffed and their contours entirely obliterated. A large amount of blood is present.

5. Mixed forms of 2 and 3 occurring particularly in diabetes mellitus. The capillaries are unequally distributed and greatly twisted, with widening and stasis.

Callender[10] points out that considerable variation in size, shape and number of capillaries occurs in the average normal individual. A twisting or displacement of the limbs of a capillary loop may be seen, and the length of the limbs varies within relatively wide limits. The depth of vision is dependent on the thickness of the overlying tissues. Individual loops differ in length, spread of the arc and the caliber of the vessels that comprise them.

TECHNIC OF GINGIVAL CAPILLARY PHOTOMICROGRAPHY

The apparatus employed in the gingival capillary study (Fig. 1) gave a visual magnification of 66 times. The source of illumination was a low voltage lamp

(6 volt, 5 ampere lamp, set on 6 amperes) whose beam of light, reflected by mirrors, is passed through a ring condenser built around the objective, to the depths of the tissue in the chosen area. The image is carried through an 11 × I. A. objective and a periplan ocular to a mounted camera with a final magnification on the negative of 22 times. An immersion attachment, built around the objective, was employed. This device prevents the clouding of the objective in the humid atmosphere of the mouth. A viewing device for focusing exists below the camera. Both plenachrome and panchromatic film were used, and each frame measured 24 by 36 mm. Two standard green filters were found to give the sharpest contrast and best definition to the capillary structures and so were used throughout. The exposure time varied from one-fifth to one-tenth second, the short exposure being essential to avoid blurring due to involuntary movement of the subject. Vertical adjustment for height was made possible by movement on the stand on which the apparatus is mounted, while anterior and posterior movement necessitated the use of a ratchet, similar to that found on a microscope.

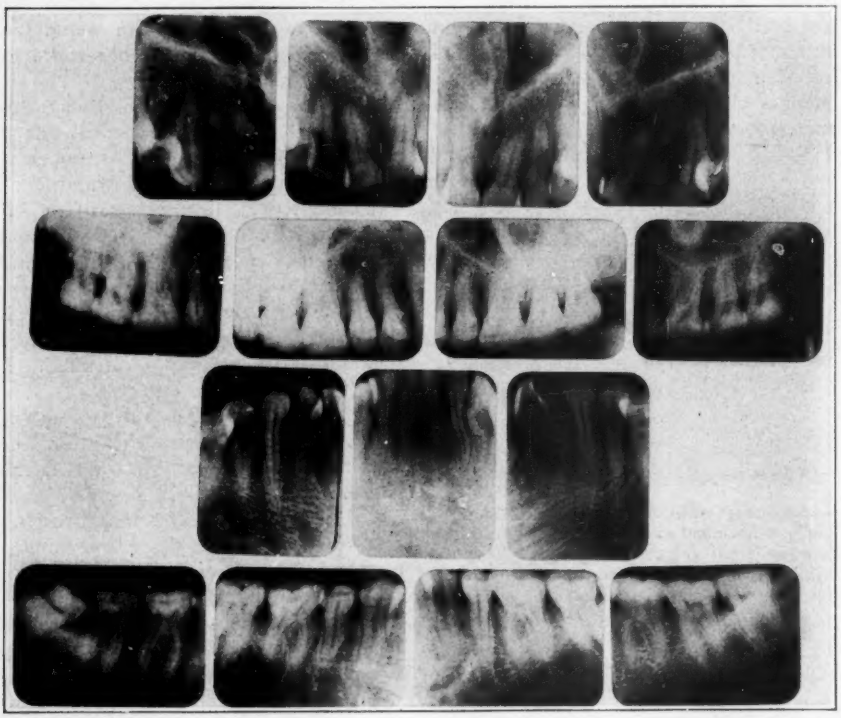

Fig. 4.—Roentgenographic series of patient shown in Figure 3. The small medullary spaces, the well-formed trabecular structure of the bone and the heavy laminae durae around the teeth are to be noted. The inclined planes of the teeth are well worn and there is no caries.

GINGIVAL CAPILLARY PHOTOMICROGRAPHY OF NORMAL PERIODONTAL TISSUES

An appreciation and attempt at interpretation of abnormal gingival struc-

tures for clinical diagnosis are dependent on an understanding of the normal. In a similar fashion, the normal gingival capillary photomicrograph must be the basis both for interpretation of abnormal capillary structure and for correlation with the clinical periodontal findings.

Observations on a series of patients with periodontal tissues that were normal in appearance clinically, and whose dental roentgenograms showed no abnormalities, gave a characteristic picture of the gingival capillaries. An example of normal gingival capillary appearance is shown in Figure 2. Close study of the photomicrograph will indicate the small size of normal gingival vessels. It should be noted that a magnification of 22 times was photographed on 24 by 36 mm. film, which subsequently was enlarged to approximately 9.2 by 14.0 cm. The final magnification was therefore slightly less than 4 times the original magnification of 22 times, or about 83 diameters larger than the normal *in vivo*. These magnifications were maintained throughout the study.

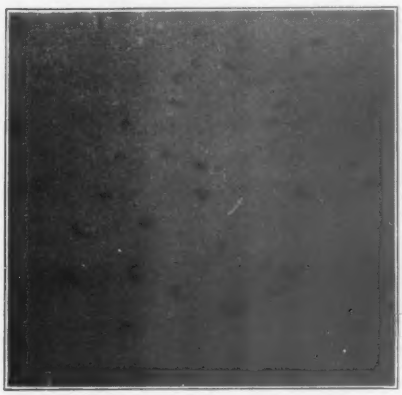

Fig. 5.—Photomicrograph of gingival capillaries in interproximal gingival tissue of case shown in Figure 3 as taken with the capillary microscope. The distribution, viewable length and diameter of the capillaries are closely similar to the normal as shown in Figure 2.

Measurements of the length of the capillaries from the top of the loop along the longer limb indicated that such length may vary between 1 and 4 mm. or actually are present in the gingival tissues with a viewable length of 12 to 48μ. The gingival capillaries form a so-called terminal circulation and tend to lie, chiefly, more or less perpendicularly to the outer gingival tissue. They are seen with abbreviated limbs since the loop proper tends to obscure them. Those capillaries which lie in other planes, tending to run parallel with the overlying gingival tissue, are seen to present longer viewable arterial and venous limbs.

Measurements of the diameter of the capillary loops indicate that normally *in vivo* the capillaries tend to maintain their posture or tonus at 6 to 18μ. It should be recalled that the diameter of a normal erythrocyte is approximately 7.25μ, and it has a thickness of about 2μ at its thin center. While interchange of substances is probably facilitated by the resultant relatively slow rate of flow, the superficial gingival circulation is, normally, probably far from plentiful. Evidence of relative fullness of some vessels with contrasting depletion of blood contents in others would seem to substantiate the

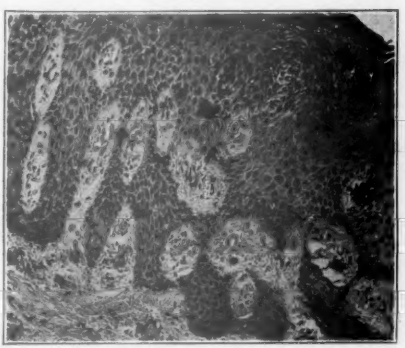

Fig. 6.—Low power section of interproximal papilla in case shown in Figure 3. The overlying squamous epithelium is evenly thickened, with numerous long pegs and narrow papillae.

hypothesis of alternate opening and closing of sets of capillaries in given areas in response to specific needs of the tissues.

Detergent Diet Group

General Considerations

A detergent diet can be considered as a diet which effects some degree of cleaning of the teeth and has a definite stimulating effect on the gingival tissues during mastication. Not all foods need necessarily have such an effect in a "detergent diet," but the general tendency is to be considered. Foods that tend to be fibrous and that necessitate vigorous chewing for the formation of a bolus undoubtedly have a stimulating effect on the periodontal membranes of the teeth, the alveolar bone and the gingival tissues. With age, a gradual wear of the inclined planes of the teeth must be effected to conserve the health of the periodontal tissues. Such wear occurs in adults only if the foods masticated are of such nature as to require vigorous work in chewing. Wear may be caused by gritty substances taken inadvertently, or artificial grinding by the dentist as a compensatory measure where disease processes are related to lack of wear of the inclined planes of the teeth, inducing traumatic occlusion.

A syndrome of findings are characteristic of cases in which wear of the teeth has occurred normally with a detergent diet. In compensation for the vigorous use of the jaws, and the need created for considerable pressure in biting (since with wear of the inclined planes of the teeth, flat surfaces are formed the efficiency of which in mastication is decreased), the muscles employed in mastication (masseter, temporal, pterygoids, etc.) become well developed. The face tends to be square and the mandible characteristically "heavy." Roentgenograms of the jaws in such cases indicate the medullary spaces to be small, the trabeculae dense and well formed and the laminae durae thickened. Clinically, the wear of the teeth, the tendency to balanced occlusion in the various excursions of the mandible (due to the natural wear of the cuspal inclined planes of the teeth) and the well hornified, thickened pink gingival tissues are outstanding. These mouths, in general, are highly resistant to infectious involvement.

The tendency to calculary deposition is minimized when a detergent diet is

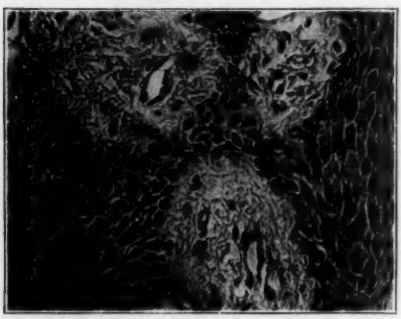

Fig. 7.—High power view of Figure 6. The evenly stained fibrillar stroma contains normal, undilated blood vessels, while the collagen bundles are coarse and uniformly stained.

Fig. 8.—Teeth of man, aged 22, showing inflamed, edematous gingival tissues. Poor oral hygiene and use of a non-detergent diet resulted in considerable calculus deposition and formation of mucoid material over the surfaces of the teeth.

used. Ruling out such factors as heredity and characteristics of the saliva, it would seem that these mouths tend to keep themselves "clean" with haphazard or non-existent care. As a whole, the index of dental caries is low. The prime influence may be the nature of the diet employed.

REPORT OF A CASE

A man, aged 47, presented a typical picture of well-hornified gingival tissues and freedom from calculus deposition. (Fig. 3.) The history showed that a detergent diet had been followed for many years. The teeth were brushed about once a week with a standard dentifrice. Clinical examination indicated that wear of the inclined planes of the teeth had proceeded normally. A full series of roentgenograms (Fig. 4) substantiated the structural portion of the syndrome. The small medullary spaces, the relatively heavy trabecular structure of the bone and the thickened laminae durae were present. Examination of the gingival capillary structure by the method previously described revealed the normal capillary structure characteristically present in this type of condition. (Fig 5.) The capillary loops showed no changes from the structure described as normal. Their distribution tends to be even and their length is in the range of from 12 to 48 μ, with a diameter of from 6 to 18 μ (calculation of actual *in vivo* size). An interproximal papilla typical of the anterior tissues of the mouth (between the upper left lateral incisor and cuspid)

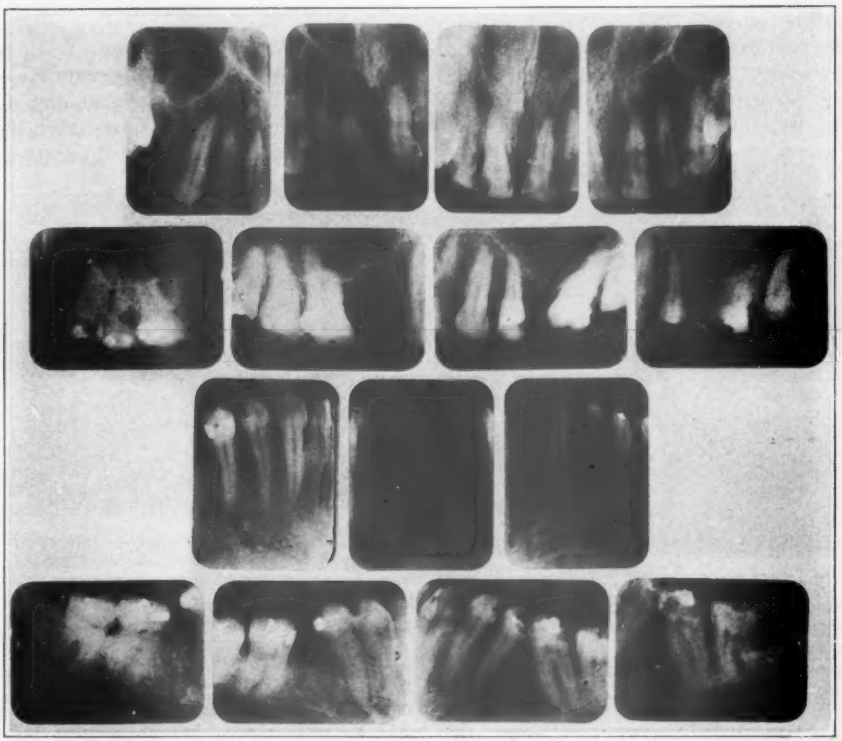

Fig. 9.—Roentgenographic series of patient shown in Figure 8. The large medullary spaces, thin trabeculation of the alveolar bone and extensive cavitation of the teeth are to be noted.

was taken for sectioning. The low power (Fig. 6) and high power (Fig. 7) sections* show the uniformly thickened nature of the squamous epithelium. The pegs are numerous and long and the papillae are narrowed. The evenly stained fibrillar stroma contains normally small, undilated serving vessels. The collagen bundles are coarse and uniformly stained. Inflammatory cells are rare.

SUMMARY OF FINDINGS OF DETERGENT DIET GROUP

The attempt to show, by means of a selected case, the characteristic oral findings with a strongly detergent diet and the occurrence of pathologic changes in the resistant periodontal tissues in various conditions lends support to the basic validity of gingival capillary microscopy when correlated with clinical findings and history. The well-hornified gingival tissues resulting from this type of diet are supplied with small hairpin-shaped gingival capillaries, which are normal in number, distribution and tonus. With lack of stimulation, the action of gingival irritants or possible systemic involvement, the gingival vessels show changes toward dilation. The resistance of the tissues seemingly is manifested by the tendency of the capillary vessels to persist in the normal state.

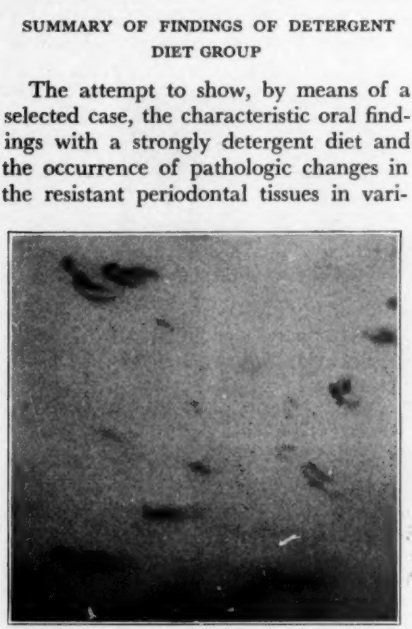

Fig. 10.—Photomicrograph of gingival capillaries in interproximal gingival tissue of case shown in Figure 8 as taken with capillary microscope. The capillary dilation and greater viewable length of arterial and venous limbs are characteristic of lack of gingival circulation.

*All tissue sections were examined and described by Charles G. Darlington, M.D., and Gregory N. Brown, M.D.; Department of Pathology, New York University College of Dentistry.

THE NON-DETERGENT DIET GROUP

GENERAL CONSIDERATIONS

The concept of a non-detergent diet is relatively well defined. A person may be said to have a non-detergent diet if the preponderance of the foods taken in the diet are of such nature as to require little chewing, and, in their use, neither cleaning of the teeth nor stimulation to the gingival tissues is afforded.[11] The non-detergent foods, such as soft bread, cereals, potatoes, cake, bananas and milk, tend to form heavy, adherent mucoid plaques on the tooth surfaces, and a basic mechanism for dental caries thereby is created. The ever greater tendency to the use of refined and prepared foods in civilized life has met with wide recognition. The use of prepared foods has been deplored and vehemently attacked

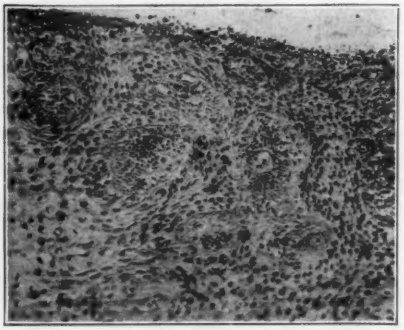

Fig. 11.—Low power section of interproximal papilla taken in case shown in Figure 8. The unevenly hyperplastic squamous epithelium has sickle-shaped spiked pegs and chronic inflammatory cells dot the stroma.

for the damage that it causes, but careful observers agree that no effective advance has been made in combating the increasingly wider use of such foods. Aside from correction of the diet to a definitely detergent character, correct and systematic toothbrushing in a régime of oral hygiene offers the greatest hope.

There are probably various hereditary, endocrine and nutritional factors in the individual susceptibility or resistance to be described. Because of lack of gingival stimulation from such a diet (and if oral hygiene is not practiced with sufficient care), the marginal gingival tissues appear smooth, red, edematous and of poor tone. These tissues are usually referred to as being "hyperemic." The teeth are

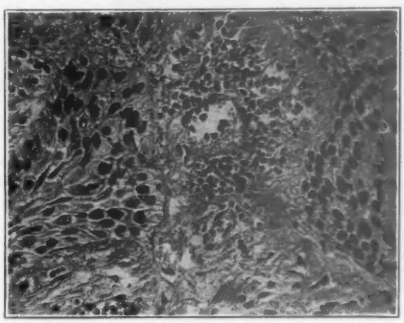

Fig. 12.—High-power view of Figure 11. The fragmented non-fibrillar collagen often appears coarsely granular and edematous, while the small serving vessels have poor definition and are dilated.

covered with a heavy mucoid film, while, cervically, calculary depositions and *materia alba* are invariable findings. Dental caries and food impaction may act as further irritants to the gingival tissues. Dental roentgenograms of the gingival tissues of individuals subsisting on soft, non-detergent diets, characteristically show large medullary spaces and delicate trabeculations.

In the following selected cases, an effort will be made to show the relationship of the type of diet to the clinical periodontal abnormalities and the changes in pathologic section and gingival capillary structure.

REPORT OF CASES

A man, aged 22, presented markedly reddened and inflamed gingival tissues that appeared edematous and the stippled surface of which had been lost. (Fig 8.) Calculus and *materia alba* were present cervically, while a heavy mucoid layer coated the surfaces of the teeth. The history verified the definitely non-detergent nature of the diet and indicated that oral hygiene was not practiced. The roentgenograms (Fig. 9) show the extensive cavitation which had occurred in the teeth, and the relatively wide

Fig. 13.—Teeth of man, aged 54, showing marked bluish red gingival tissues and low gingival tone. Heavy calculus deposition and considerable gingival recession had occurred. A non-detergent diet had been used for a period of eighteen years and no gingival stimulation had been practiced.

medullary spaces and thin trabeculae present in the supporting bone. A photomicrograph of the gingival capillary structure (Fig. 10) shows the dilation and stasis characteristic of lack of gingival stimulation. The viewable length of the capillary limb is 144 μ *in vivo* (normal, from 12 to 48 μ), and the diameter reaches a maximum of 30 μ (normal, from 6 to 18 μ). The hairpin shape of the capillary loop remains discernible. A specimen of the interproximal papilla between the lower left lateral incisor and cuspid was taken as typical of the anterior tissues of the

mouth. Low power (Fig. 11) and high power (Fig. 12) sections show the unevenly hyperplastic nature of the squamous epithelium with its sickle-shaped, spiked pegs. The papillae carry a fragmented, non-fibrillar collagen that often appears coarsely granular and edematous. The small serving vessels have poor definition and are dilated, and, in several fields, their rupture has caused a flooding of the adjoining tissues with red cells. Chronic inflammatory cells dot the stroma.

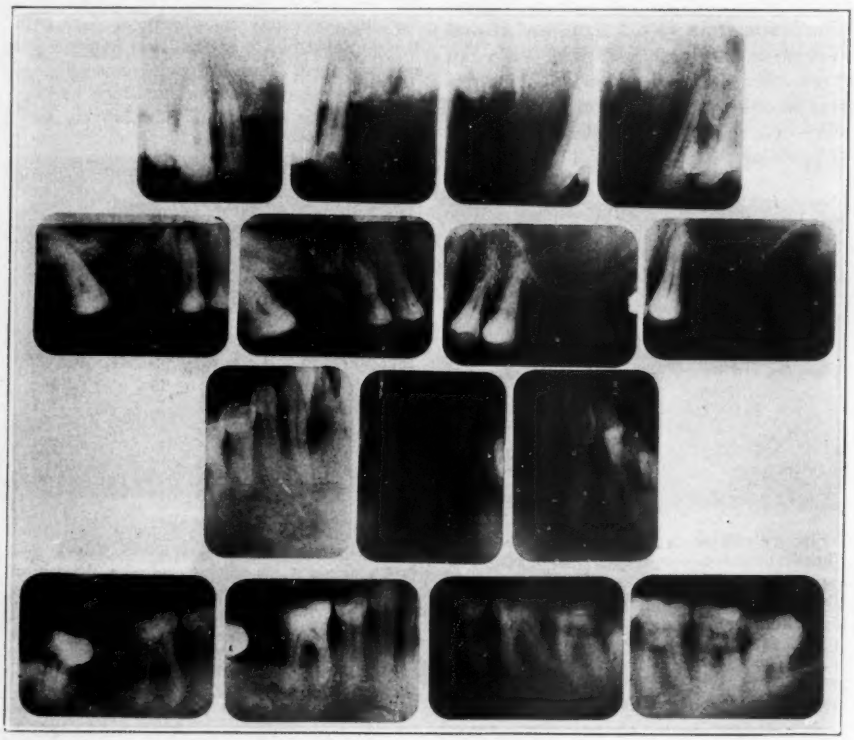

Fig. 14.—Roentgenographic series of patient shown in Figure 13. Advanced alveolar bone destruction and extensive tooth involvement are evident.

A man, aged 54, presented markedly bluish red gingival tissues of extremely low tone. (Fig. 13.) Considerable deposition of calculus and *materia alba* was present and abnormal gingival recession had occurred. The teeth were coated with a heavy film. The roentgenograms (Fig. 14) showed advanced bone destruction and the extent of tooth involvement. The history indicated that a non-detergent diet had been taken for the last eighteen years (since the patient's emigration from his native land, Italy), and that no oral hygiene whatever was practiced. The history further indicated the possibility of a subclinical scurvy. Tests of the resistance of the arm capillaries and the rate of urinary excretion of vitamin C^{12} substantiated the diagnosis. A complete physical examination by the family physician afforded no additional significant systemic findings. A photomicrograph of the capillary structure in the anterior portion of the mouth (Fig. 15) shows the unusual capillary forms occurring in this type of condition. In addition to the manifest dilation of the vessels, a tortuosity and interconvoluting of the

capillaries occur, together with a lack of definitive outline. Small vessel aneurysms are common. Observations on other cases of subclinical scorbutus seem to indicate these vessel changes as characteristic of the condition. It should be recalled that vitamin C has, as one of its functions, the property of aiding in the formation of intercellular cementum connecting the endothelial cells making up the capillary walls.[13,14,15] Lack of vitamin C, in scorbutic states, results in capillary hemorrhage owing to the lack of effective maintenance of the capillary posture through imperfect cementation of the capillary endothelial cells. The gingival capillary changes described are probably the result of this deficiency. The viewable length of the capillary limbs varies here between 60 and 180 μ *in vivo,* and the diameters of the vessels range between approximately 18 and 27 μ. A specimen of the interproximal papilla between the lower right lateral incisor and cuspid was taken as typical of the lower anterior tissues of the mouth. Low power (Fig. 16) and high power (Fig. 17) sections show the non-keratinizing and non-hyperplastic nature of the squamous epithelium. The pegs are spiked and thin. The tiny serving vessels are widely congested and, in several fields, blood has extravasated into the papillary stroma. Deeper in the tissue, the collagen is poorly fibrillar and edematous and shows a granular degeneration particularly about some of the dilated serving capillaries. Chronic inflammatory cells are present in this granular débris.

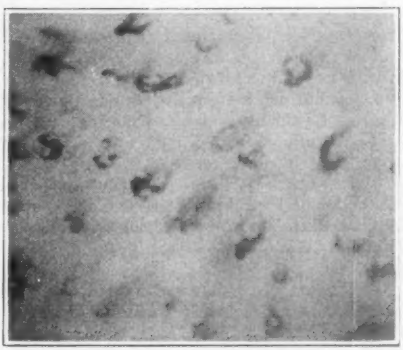

Fig. 15.—Photomicrograph of gingival capillaries in interproximal gingival tissue in Figure 16 as taken with capillary microscope. A subclinical scurvy showed considerable dilation of the gingival capillary vessels, together with a distinctive tortuosity and interconvolution of the capillaries, and a lack of definitive outline.

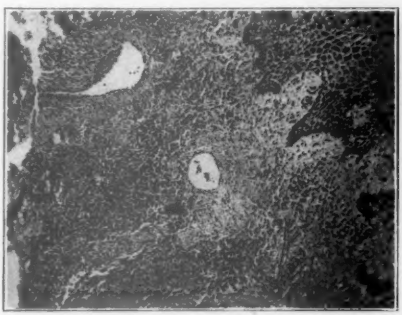

Fig. 16.—Low power section of interproximal papilla taken in case shown in Figure 13. The squamous epithelium is non-hyperplastic and the pegs are spiked. The small serving vessels are widely congested and, in several fields, blood has extravasated into the papillary stroma.

SUMMARY OF FINDINGS IN NON-DETERGENT DIET GROUP

The poor gingival tissue tone in cases of non-detergent diet (in which toothbrushing is not practiced) manifests itself by a bluish red, non-stippled marginal gingivae clinically, by blood vessel and collagen changes in pathologic section, and by definite dilation of the gingival capillaries when examined *in vivo.* The etiology of dental caries is unknown, but the high index in these cases, as part of the syndrome, indicates a significant relationship. Proper gingival stimulation by dietary adjustment of detergent foods, together with a proper toothbrush régime, will effect improvement.

SUMMARY AND CONCLUSIONS

1. Normal gingival capillaries, as viewed by capillary microscopy, tend to maintain their posture or tonus at a diameter ranging from 6 to 18μ *in vivo,* and with a viewable length of arteriolar and venu-

lar capillary limbs ranging from 12 to 48μ *in vivo*.

2. Individuals using a diet that is hard and detergent show a characteristic oral syndrome of (a) wear of the morsal and proximal surfaces of the teeth; (b) a well-developed facial musculature; (c) the presence of small medullary spaces and dense trabeculation of the maxillary and mandibular bones; (d) little tendency to calculary deposition; (e) the presence of well-hornified, resistant gingival tissues; (f) a low caries index, and (g) according to gingival capillary microscopy, normality of gingival capillaries in number, distribution and tonus. With lack of stimulation, the action of gingival irritants or possible systemic involvement, the gingival vessels show changes toward dilation.

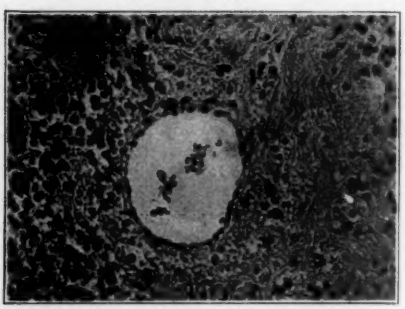

Fig. 17.—High power view of Figure 16. The collagen is poorly fibrillar and edematous, and shows granular degeneration, particularly around some of the dilated serving vessels.

3. Individuals using a diet that is soft and non-detergent show a characteristic oral syndrome of (a) lack of wear of the morsal and proximal surfaces of the teeth; (b) a poorly developed facial musculature; (c) the presence of wide medullary spaces and thin trabeculation of the maxillary and mandibular bones; (d) a marked tendency to mucoid and calculary deposition on the tooth surfaces; (e) lack of gingival stimulation as evidenced by smooth, bluish red and edematous marginal gingival tissues; (f) a high caries index, and (g) according to gingival capillary microscopy, marked dilation of these vessels. The capillary diameter may reach a maximum of 27μ (normal range from 6 to 18μ), and the length of the viewable capillary limb may reach a maximum of 192μ (normal range from 12 to 48μ). A characteristic dilation, tortuosity and interconvoluting of the gingival capillary structures appears in subclinical scorbutus.

4. The clinical and pathologic findings substantiate the gingival capillary findings in the cases described, evidencing the basic validity of gingival capillaroscopy.

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METHODS OF TESTING FOR BACTERIAL GROWTH DURING THE TREATMENT OF INFECTED ROOT CANALS

By Edgar D. Coolidge, M.S., D.D.S., Chicago, Ill.

BACTERIOLOGIC examination of root canals under treatment, where the presence of micro-organisms or infected material is suspected, has become an important part of the routine of treatment before filling the canals. Present-day teaching of therapeutic principles that relate to the treatment of pulp and periodontal disease is based upon the biologic sciences and upon research. Graduates in dentistry of recent years are familiar with bacteriologic technic, although it is possible that many graduates have not been taught to employ bacteriologic technic in the treatment of pulpless teeth.

ATTITUDE TOWARD PULPLESS TEETH

The attitude of many members of the dental and medical professions toward pulpless teeth indicates a loss of faith in the possibility of successful handling of pulpless teeth by known methods of treatment. In many instances, this lack of faith represents a lack of knowledge of research work that has been done along these lines. The demands made of the operator in the practice of dentistry that he acquire and maintain technical skill in mechanical lines are so exacting that many have not shown a desire to keep informed on the progress made in the biologic sciences, but have willingly accepted statements that are not scientifically correct. It is necessary not only to keep informed of important research along biologic lines, but also, and more important, to apply the findings of research to daily practice of the profession.

There has been a widespread tendency to condemn pulpless teeth to extraction on the basis of suspicion rather than on direct evidence of periapical disease or definite knowledge of the relation of pulpless teeth to systemic disease. Many reports of investigations in the past have been based upon the study of material obtained in hospitals and clinics. Many of the conclusions drawn from evidence of bacterial growth in cultures taken from extracted teeth were shown to be unsound by Fish and Maclean.[1] Attention has been called by Blayney[2] and

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others to the necessity of considering the case history which includes the record of treatment of the tooth, in order to make a more scientific diagnosis, before extracting roentgenographically negative pulpless teeth.

Tunnicliff and Hammond[3] have shown that 33 per cent of sound teeth with healthy pulps extracted carefully and completely sterilized on their external surfaces still give positive growth cultures from the pulps. Examination of microscopic sections taken from the areas of the pulps that gave positive growth in cultures revealed no inflammatory reactions in the pulp tissue; which was interpreted as positive evidence of contamination during extraction. This investigation very definitely suggests that many of the reports of earlier investigators upon positive cultures from extracted pulpless teeth may simply show the presence of micro-organisms that was accidental and not necessarily a fact before those teeth were extracted. Stein[4] also found in his studies that the pulps of 32 per cent of all sound teeth extracted with the greatest of care were contaminated during extraction. The incidence of contamination was much higher in molars and bicuspids than in anterior teeth.

The findings of these investigators indicate that the scientific solution of the pulpless tooth problem is not to be found by the extraction of all pulpless teeth, and the mere fact that extracted teeth when sterilized on the surface and dropped into culture medium show a growth of micro-organisms is no longer accepted as proof that the tooth harbored infection when in the mouth. A tooth with a vital and healthy pulp is to be desired, but to condemn all roentgenographically negative pulpless teeth to extraction cannot be accepted as scientific treatment.

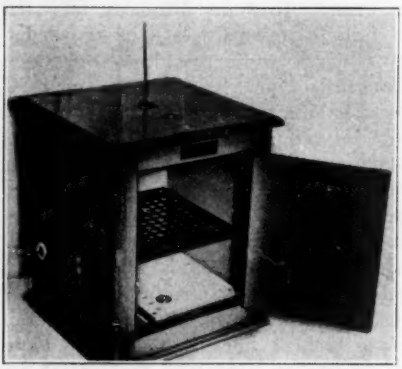


Fig. 1.—Small electric, thermo-regulated incubator 9 by 9 by 12 inches, suitable for dental needs. (Courtesy of V. Mueller & Company, Chicago.)

Fig. 2.—Thermo-regulated water heater showing thermometer suspended from arm from which two test tubes of culture media are also suspended. The temperature regulator is set to maintain a uniform temperature of the water at 100°F. In the test tube at the right, no growth is observed, while a heavy growth appears in the test tube at the left.

SOURCES OF EVIDENCE IN INVESTIGATION

Investigations of the root-canal problem should include teeth with a recorded history of treatment as well as those without a history of treatment in order to properly evaluate the results of treatment of pulpless teeth. Such a history should include the condition of the pulp and periodontal tissue at the time of treatment. This, of course, includes the roentgen-ray record, which is the usual

means of determining the condition of the periapical tissues before the extraction of the tooth. The record of treatment should be an essential part of the history. Bacteriologic tests made during treatment add substantial evidence which, although not infallible, is an important step in the approach to successful treatment.

The clinical history of a tooth revealing functional efficiency and comfort to the patient is of little value, since many teeth with gross pathologic areas around the apices give such clinical histories. However, the roentgen-ray record, year after year, furnishes an important link in the clinical history. The final source of evidence of the success of root-canal treatment is found in the histologic ex-

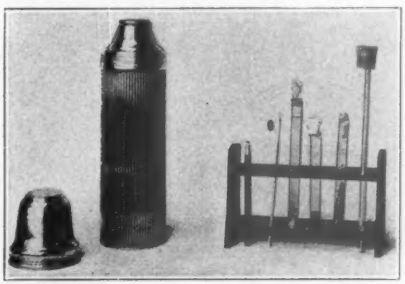


Fig. 3.—Equipment needed for cultural examination. From left to right: Quart thermos bottle and cap, pencil for writing on glass, loop needle, Rosenow brain broth, "hormone" broth, blood-agar, thermometer stuck through cork of thermos bottle. (Appleton.)

amination of extracted teeth that have satisfactory clinical records over a period of years. It is difficult to obtain this final evidence because those teeth which have a perfect clinical record are not willingly relinquished by their owners, and it is only in the event of fracture or loss of a tooth from periodontal disease that such a tooth can be acquired for histologic study.

PROGNOSIS

Successful treatment of infected root canals is possible. It depends on the complete sterilization and complete filling of the canal and on the potentiality of repair of the tissue surrounding the root. This potentiality of repair of the periodontal tissue is greatest where a vital pulp is surgically removed. It is lowest where the periapical tissue is grossly pathologic. When the obstruction is removed; that is, when the infection is removed and the root canal is completely filled so as to obliterate the open space

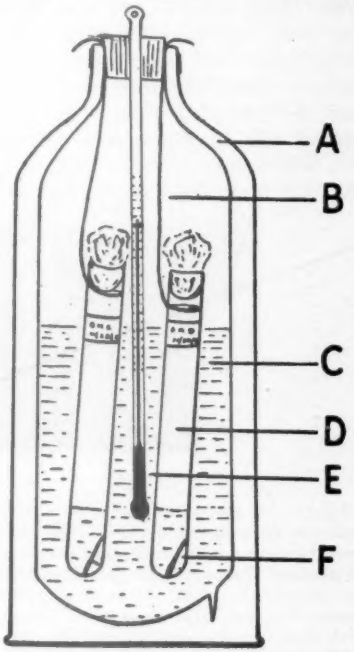


Fig. 4.—Cross-section of thermos bottle incubator. (Grossman.)

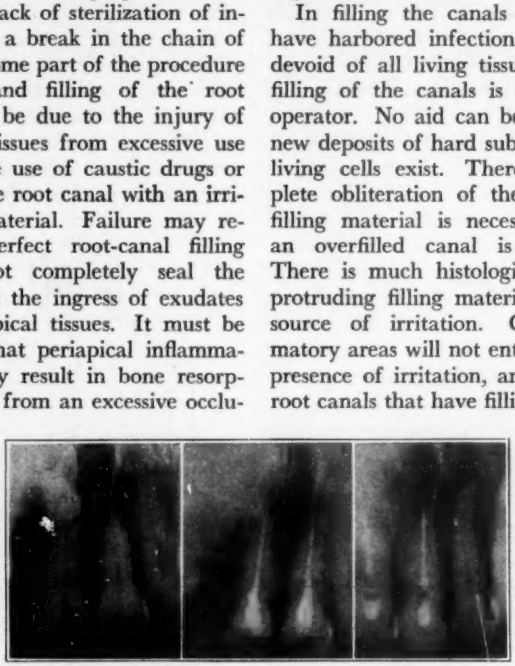
where fluid can accumulate and stagnate, the defense and repair mechanism of the vital tissue surrounding the tooth will usually function.

The proof of the success of treatment is based upon the roentgenographic evidence of normal tissue in the periapical region. This evidence may be further substantiated by frequent microscopic examination of extracted teeth with a

known history for comparison of the histologic evidence with the roentgenographic evidence. Failure in the treatment of gangrenous and pulpless teeth is often due to a lack of sterilization of instruments or to a break in the chain of asepsis during some part of the procedure of treatment and filling of the root canals. It may be due to the injury of the periapical tissues from excessive use of broaches, the use of caustic drugs or overfilling of the root canal with an irritating filling material. Failure may result from imperfect root-canal filling which does not completely seal the foramen against the ingress of exudates from the periapical tissues. It must be kept in mind that periapical inflammation, which may result in bone resorption, may occur from an excessive occlusal stress brought to bear upon any tooth containing a living pulp as well as upon one that is pulpless. Such areas of bone resorption are not easily differentiated from pathologic areas due to infection.

Before instituting treatment of teeth of this classification, it is necessary in all cases to make a careful diagnosis and to determine the advisability of treatment on the basis of the general health of the patient, the extent of the tissue changes in the apical region, the value of the tooth to the patient and the possibility of successful drainage and complete filling of the root canal.

In filling the canals of teeth which have harbored infection and which are devoid of all living tissue, the complete filling of the canals is the goal of the operator. No aid can be expected from new deposits of hard substance where no living cells exist. Therefore, the complete obliteration of the canals by the filling material is necessary. However, an overfilled canal is not desirable. There is much histologic evidence that protruding filling material is a constant source of irritation. Chronic inflammatory areas will not entirely heal in the presence of irritation, and the results in root canals that have filling material protruding through the apical foramina and other apical areas and in which healing is incomplete after two years should be considered unsatisfactory, calling for surgical assistance in the form of root resection.



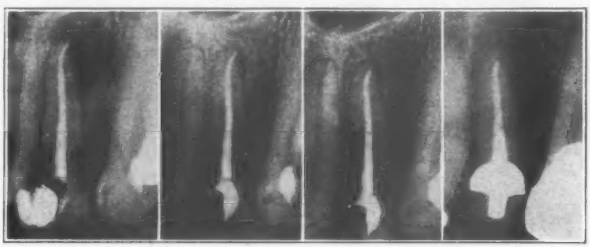
A B C

Fig. 5.—A: Incisor teeth of woman of middle age. The right lateral incisor was lost in an accident and the pulps of the two central incisors became necrotic. The pulp chamber of the right central incisor was opened and, because of pain, was left open and exposed to the saliva. The traumatized tissues were subjected to infection; which resulted in increased pain, swelling and loosening of the tooth. After sterility of the canals was obtained by treatment and verified by culture test, the canals were filled. B and C: The same teeth two years after treatment. The teeth were firm and comfortable. The improvement in the alveolar bone surrounding the central incisor is evident.

CONTROL OF INFECTION IN ROOT CANALS

The types of organisms that concern the operator in the treatment of exposed vital pulps or gangrenous pulps that are

undergoing putrefaction and in treatment of infected root canals with imperfect fillings are very similar on analysis. According to Appleton,[5] the organisms best fitted for pulp invasion are the streptococci. These organisms, which are both aerobic and anaerobic, are capable of growth in closed root canals as well as in open root canals. The treatment of infected root canals is mostly concerned with the various forms of cocci: streptococci, staphylococci and pneumococci. Germicides selected for the treatment of infected root canals should be those that will destroy the micro-organisms with a minimum of damage to the living tissue in accessory pulp canals or in the surrounding apical tissues. It is needless to say that germicides that coagulate albumen are limited in their ability to penetrate into inaccessible places in the root canal and are therefore disqualified for the treatment of infected root canals.



A B C D

Fig. 6.—Complete healing of granuloma at apex of lateral incisor of woman in middle life. A, roentgenogram showing granuloma at time root was treated and filled. B, same tooth five years later. C, tooth ten years later. D, tooth twenty-five years later. The cementum layers were deposited over the apex of the root so that the gutta-percha filling appears to be shorter than the root, while it extended to the periphery in A and B.

Prinz[6] suggested rules for the treatment of infected wounds which definitely apply to the treatment of infected root canals:

1. The germicide should be strong enough to destroy the organisms in a given time.

2. The germicide must have sufficient time for germicidal action.

3. The germicide must have actual contact with the micro-organisms in order to destroy them.

In order that the germicide may have contact with the micro-organisms in all parts of an infected root canal, it must be selected with consideration for physical and chemical principles relating to penetration. Such principles as capillary attraction, surface wetting, difference in surface tension and diffusion can be employed. Time will not permit of more than the mere mention of these principles. Suffice it to say that the problem of disinfecting root canals demands careful application of certain principles of physics and chemistry.

The use of chlorine in the treatment of infected wounds has become a common practice. Chlorine may be applied in the treatment of infected root canals by means of ionization of a solution of sodium chloride or zinc chloride, or it may be obtained by the liberation of nascent chlorine from a solution of monochlorphenol or a solution of chloramine.

Chloramine ranks very high as an antiseptic or a germicide in the treatment of infected wounds. It is logical that this solution which is so useful in the control of infection in gunshot wounds should be applicable in the treatment of root

canals. It destroys infection with little injury to the living cells when used as a germicidal wash in intermittent contact with infected tissue. It does not coagulate albumen, although it is slightly irritating to living tissue. Chlorine is linked to nitrogen in the chloramine molecule, which releases chlorine slowly in the presence of protein.

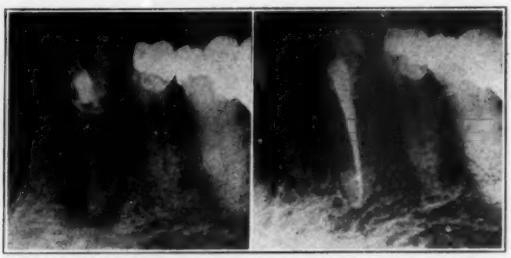
For the treatment of infected root canals, an aqueous solution of chloramine of from 2 to 5 per cent strength is very effective. I have used the following formula for many years with entire satisfaction:

Chloramine compound solution	
Chloramine	5.00 gm.
Sodium chloride	0.80 gm.
Sodium hydroxide	0.25 gm.
Distilled water q.s.	100.00 cc.

Chloramine compound solution is used mainly as a germicidal wash during the process of cleaning and enlarging the canal, which brings the germicide in contact with every portion of the root canal during the treatment. It is also used as a dressing to be sealed in the root canal between appointments. It is, however, not advisable to attempt to wash the entire infected canal at the first sitting, but to withhold cleaning and washing the apical half of the canal until the second appointment.

BACTERIOLOGIC TESTS FOR THE PRESENCE OF INFECTION BY CULTURE

Making the bacteriologic test by culture in the treatment of root canals gives greater assurance that the root canal is free from infection than can be obtained by any other method. Grossman[7] has shown that attempts to determine when the infection has been destroyed by the appearance and odor of the dressing removed from root canals may fail. In 150 cultured teeth which were considered ready to fill by the ordinary methods, the bacteriologic test revealed that 42 per cent of the root canals still produced a growth on culture. This investigation shows that about four of ten root canals considered ready for filling may be found infected on culture. Certainly the responsibility involved in the treatment and filling of root canals at the present time demands that every means of safeguarding the health of the patient be employed. Every operator who attempts root-canal filling must assume the responsibility of controlling the infection in the field in which he operates. This investigation does not indicate that four out of ten infected root canals cannot be made sterile by proper treatment. It simply indicates that the bacteriologic test is far more reliable than the old method of determining sterility by the condition of the dressing removed from the canal.



A B

Fig. 7.—A, gangrenous pulp with chronic periapical inflammation; mandibular cuspid of woman aged 35. B, same tooth eight years after treatment and root-canal filling. There is no evidence of periapical inflammation.

EQUIPMENT REQUIRED FOR MAKING BACTERIOLOGIC CULTURE TESTS

The essential equipment for culturing

root canals before filling them is quite simple. If one has access to a commercial bacteriologic laboratory or to a hospital laboratory, arrangements can usually be made by which the laboratory will provide culture media and will incubate the cultures, so that the dentist is not required to provide such equipment. Should it be desirable to have the incubation carried on in the dental office, a small thermo-regulated incubator can be secured at a very small cost. The incubation of cultures requires only a regulated temperature at the level of human temperature, which is 37° C., or 98.6° F. A simple home-made incubator suggested by Appleton,[7] and to which Grossman refers, consists of an ordinary quart thermos bottle. The stopper used is a large cork, through which a hole is made to permit a thermometer to be inserted in order to record the temperature of the contents at different intervals. The culture tubes are swung from hooks or strings inserted in the cork stopper. Another simple incubator can be made by using an electric water heater with a thermostatic control in which the desired temperature can be maintained for any desired length of time.

Culture media can be obtained from commercial laboratories as needed, or can be obtained in greater quantities in sterile tubes and kept in a refrigerator until used. Rosenow's glucose brain broth is most highly recommended.

TECHNIC OF THE CULTURE TEST

The test for the sterility of the canals is not made until the treatment is considered complete and the canal expected to be free from infection. Usually, this is at the third or fourth appointment, and instead of filling the canal at this time, it becomes part of the regular routine to make a culture test for sterility. Those who are familiar with bacteriologic technic realize that it is very difficult to make a bacteriologic test without contaminating the culture tube with organisms that are not obtained from the root canal.

A B

Fig. 8.—A, imperfect root-canal filling and periapical bone destruction. B, same tooth ten years after treatment and complete root-canal filling. The periapical tissues appear to be free from inflammation.

Before adjusting the rubber dam, the mouth is sprayed with an antiseptic and the rubber dam is applied with great care to thoroughly isolate the tooth. The surfaces of the exposed tooth or teeth are very thoroughly washed with a germicidal solution several times and painted with Lugol's solution. With sterile burs, the root canal is opened and the dressing removed from the canal. This dressing is discarded, and if there is any antiseptic remaining in the canal, it is absorbed with sterile absorbent points and discarded before the culture test is actually made.

A sterile cone is carefully inserted in

the root canal so that the point protrudes slightly through the apical foramen. A cone is left in the canal for a few moments, while the test tube containing the culture media is flamed. The absorbent point is carefully removed from the root canal and dropped into the culture medium, and the cotton plug is replaced in the test tube immediately. If the foramen is so small that the absorbent point does not pass into the periapical tissue, a sterile root-canal file is passed into the canal and into the foramen a few times, after which another absorbent point is passed into the canal for the culture test.

It is important that a little periapical tissue exudate moisten the tip of the cone, to insure the accuracy of the test. The culture tube is now labeled, put into the incubator and kept there for seventy-two hours at a temperature of 37° C. If the thermos bottle incubator is used, the temperature will not remain at body temperature for seventy-two hours unless the bottle is carefully packed in a box with paper insulation. However, unless the room temperature is allowed to go considerably below 70°, the temperature in the thermos bottle will remain sufficiently high for twenty-four hours to promote growth in the culture tube. Usually, at the end of forty-eight hours, there is evidence of growth if the culture is positive, but it is advisable to allow seventy-two hours to elapse before filling the root canal, to be sure that the test is complete.

A microscopic examination should be made of the contents of the culture tubes to determine the type of organisms growing if the culture is positive. If organisms are found, it is well to record on the patient's history card the type predominating. Further treatment must be given and one or two negative cultures obtained before the root canal is filled.

Occasionally, the operator will encounter a tooth from which several successive positive cultures will be obtained. If, on investigation, he is convinced that the culture medium has not been contaminated by handling during the process of taking the culture, and he is sure that there is no obscure leakage in the filling between appointments, the conclusion should be drawn that treatment is not successful. The percentage of such instances is very low, but it is a precaution against retaining a tooth that should be extracted. If these precautions are taken, it is quite evident that teeth that are not susceptible to successful treatment will be eliminated and the great number of other pulpless teeth that many operators extract needlessly will be saved without jeopardizing health.

SUMMARY

The employment of bacteriologic tests by culturing root canals prior to filling, especially those which contained infectious material, is a requirement in present-day clinical practice that can be met by every operator.

Bacteriologic tests have proved to be far more accurate than the old method of determining the condition of the root canal and periapical tissue by the condition of the dressing removed from the root canal. Many teeth, however, that were treated before bacteriologic methods were employed have given clinical evidence of being free from infection on roentgenographic examination and, after extraction, have given microscopic evidence of a healthy periapical tissue free from inflammatory cells.

Histologic study of many extracted teeth with good root-canal fillings has confirmed the evidence in many cases of the possibility of saving pulpless teeth without danger of harboring a focus of infection in the periapical tissues.

With improved methods of technic, employing surgical asepsis during root-canal operations and checking the treatment by means of bacteriologic tests, it is possible to eliminate the small per-

centage of infected teeth that are not susceptible to treatment.

The solution of the problem of the pulpless tooth is not in the extraction of all pulpless teeth, but in the differentiation between those that can be saved by proper treatment and those that should not be saved because of failure to completely control the infection.

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DENTISTRY AND THE NATIONAL HEALTH PROGRAM

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THERE are those among our present luxuriant crop of socio-economic reformers who would lead us to believe that the United States has never had a national health program worthy of the name. There are even some dentists who speak and write in this fashion, demanding that adequate medical and dental care be provided by our government for all of its citizens. They apparently do not understand the meaning or purpose of a national health program in a democracy, or they have done some wishful thinking in regard to the conditions that exist in the totalitarian state.

All regulations and laws established or enacted by governmental agencies for the protection and promotion of individual and community health constitute the health program of any state or nation. History has recorded some program of this type, no matter how simple, crude or ineffectual, since the beginning of government itself. It is quite possible that the "forbidden fruit" in the Garden of Eden had an implication for health as well as for religion. By far the most important and beneficial of all public health activities have been proposed, sponsored and carried out by members of the health professions as a result of their efforts to prevent and to treat disease.

The profession of dentistry, although only now completing its first century of existence, has not been slow to recognize its responsibility toward the improvement and maintenance of our national health program. It is unnecessary to do more than recall that the dental profession in the United States has fathered all the laws enacted by the several states and controlling and regulating the practice of dentistry in those states. Surely, the contributions of the dental schools in the matter of public health cannot be ig-

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nored. By consistently raising and enforcing standards of dental education and training, they have conferred immeasurable benefits upon the public health.

The first sign from the federal government that dentistry was to become an integral part of its national health program was given when Congress provided for a probationary army dental corps of thirty members, February 2, 1901. This action was taken at the insistence of the dental profession. Subsequent legislation has increased the number of regular army dental officers to 315, increased their rank up to and including that of brigadier-general and provided for the appointment and training of 5,300 dental reserve officers. A short quotation from an article by Brigadier-General Leigh C. Fairbank, Chief of Dental Staff, United States Army, is pertinent.

> Postgraduate instruction, our own schools, new and modern clinics, research projects and many other developments make a fascinating story of the effective developments of dentistry in the Army. It is evident that the abiding interest, the encouragement and the continued support of the dental profession in the last twenty years have made it possible for the Dental Corps to keep pace with the advances in civil life.[1]

Since 1912, the United States has had a naval dental corps, which was as small in its beginning as that of the Army. It is now serving not only the navy personnel, but also thousands of war veterans and many of the native population in the numerous insular possessions of the United States. The new Naval Medical Center being constructed in Maryland at a cost of $4,850,000 is to include a postgraduate dental school for Navy dentists.

The United States Public Health Service has, since 1919, included dental officers in its list of appointments. At present, forty-two interns are detailed to four divisions of this governmental health service. In 1936, large funds secured through Social Security taxes were made available to the service for: (1) grants-in-aid to the states for the establishment of dental health service and the training of personnel; (2) added dental consultation service to provide advice on the organization and administration of dental health service in state and local health departments; (3) increased studies involving dental problems at the National Institute of Health, and (4) increased studies for more effective means of imparting information on dental health.

The Children's Bureau of the United States Department of Labor has contributed to the advancement of preventive dentistry through its administration of the Sheppard-Towner Act (terminated in 1930) and through Title V, parts 1, 2 and 3 of the present Social Security Act. There are no dentists at present on the staff of the Children's Bureau, but dental practitioners and teachers are employed from time to time in an advisory capacity.

Both the Federal Emergency Relief Administration and the Farm Security Administration have instituted dental programs, which will be discussed later.

I have thus prefaced this discussion for two reasons: first, to remind you that not only is dentistry an integral part of our present national health program, but also it has contributed much to the formation and growth of that program, and, second, to provide a background for consideration of proposed legislation, which, if passed, will surely affect not only our present national health program, but the private practice of dentistry as well.

We are all familiar with many of the private and governmental studies, reports and conferences which preceded the introduction into Congress of the three separate and distinct health bills now pending before that body. These bills, in order of their presentation to Congress, are S. 658, introduced by Senator Arthur Capper, of Kansas, and often referred to as the "Epstein Compulsory Health In-

surance Measure"; S. 1620, introduced by Senator Robert F. Wagner, of New York, and more commonly called the "Wagner Health Bill," and S. 2963, introduced by Senator Henry C. Lodge, Jr., of Massachusetts, in the closing days of the first session of the present Congress.

The American Dental Association, as well as the American Medical Association and many other health organizations, is opposed to the passage of all three of these measures. Since Senate committee hearings have been held only on the Wagner Bill, the American Dental Association has limited its public opposition to that measure alone. Should it become evident that either of the other two measures has any possibility of passage, the American Dental Association will publicly consider and oppose them.

Rather than review here the many reasons for dentistry's opposition to the Wagner Bill, I refer you to the testimony of the National Health Program Committee of the American Dental Association as presented before a subcommittee of the Senate Education and Labor Committee.[2] I believe that you will find it both interesting and enlightening. I do, however, wish to point out and emphasize that the Wagner Health Bill is not dead; that it is still being considered by the Senate subcommittee to which it was referred, and that there is every probability of its being acted upon in a revised or amended form by the next regular session of the 76th Congress.

The Senate subcommittee considering the bill has recently issued a report[3] of its findings. I have commented on these previously, as follows[4]:

A summary of this report indicates: (1) that the members of the subcommittee as well as representatives of most of the country's larger groups are in sympathy with the objectives of the bill; (2) that Federal Legislation based upon Federal-State cooperative programs is necessary to strengthen and expand the health services of the Nation, but that the nature of such legislation should be to give technical and financial aid to the States; (3) that the present provisions of S. 1620 can be more clearly stated and improved; (4) that the proportion of Federal assistance should be greater to those States in which there is the greatest need; (5) that further provisions will be added, if necessary, to assure that the amount of Federal assistance would not be in excess of clearly demonstrated need; (6) that many criticisms have been presented relative to the bill bringing about revolutionary and dangerous changes in medical care which the committee believes unwarranted, but the committee will welcome further suggestions as to amendments which may safeguard the objectives of the bill; (7) that many lay and professional groups will be prepared to furnish further suggestions for improving the bill; (8) that a definite report on S. 1620 will be submitted soon after the beginning of the next session of Congress.

Comment—Further expansion of the Nation's present health program by an act of Congress is imminent. Both the American Medical and the American Dental Associations have staunchly and repeatedly maintained that the "Wagner Health Bill" cannot be amended satisfactorily. . . . It would logically follow that these two great professional organizations should concern themselves with the formulation of plans which could be transposed into legislative form as a substitute for this objectionable measure now proposed. This does not mean that the American Medical Association and the American Dental Association must necessarily order or supervise the drafting of suitable health legislation, but it does mean that they should be prepared to provide Congress with suitable memoranda for the writing of a satisfactory national health act, if and when Congress is ready to authorize the appropriation of sufficient funds to effectively carry out such a national health program.

A more authoritative statement on the status of the Wagner Bill is to be found in a quotation from the address of Senator Robert A. Taft on the occasion of the laying of the cornerstone of the Doctor's Building, in Washington, D. C., July 11, 1939:

The (Wagner) bill has been strenuously attacked by many witnesses from the medical profession and it is not likely to be pressed at this session, but I believe that in 1940 a federal medical program of some kind will be adopted. What form it takes depends largely on the medical profession. I am most hopeful that the doctors determine what comprehensive program can be adopted to improve the health of the American people, and that they propose a practical measure to assist that program.

HEALTH PROGRAM OBJECTIVES

The American Dental Association has expressed its approval of a progressive and constructive course for expanding the dental aspect of a national health program by the recent action of its House of Delegates. Before considering this tentative program, I desire to provide a still broader background.

James E. Bauman, in a United States Public Health Service report, defines public health law as "that body of statutes, regulations and precedents that have for their purpose the protection and promotion of individual and community health."[5]

Ann Laurie Baker, in a discussion of "Medical Care" before the Minneapolis District Dental Society, April 20, 1939, prefaced her remarks with these words: "The aim of a National Health Program is to provide medical services for people in need of medical care."[6]

Is there any resultant difference between "protecting and promoting individual and community health" and "providing medical services for people in need of medical care"? We of the health professions know that there is a marked difference. Providing medical services means providing medical care, and medical care refers to curative measures. Curative measures alone will never reduce the incidence of disease, and any governmental health program that makes no provision for reducing the incidence of disease contributes nothing to the reduction of future needs. On the other hand, protecting and promoting health demands the use of preventive, educational and curative measures. The proper combination of these three will gradually reduce the incidence of disease and therefore contribute much to the reduction of future needs. The one objective is progressive and typical of the health professions. The other objective is that of the social worker and one which makes for an ever-continuing program. I quote again from Baker:

> The method by which this aim is to be achieved is a matter of controversy, but is not the concern of social workers. Our interest is only in seeing that the thousands of people with whom we come in contact receive adequate medical care when they need it.[6]

This growing tendency on the part of social workers to contribute nothing to the public health problem, but merely to discover need and demand its satisfaction by governmental agencies regardless of cost is anything but constructive and progressive. It is inimical to the future health of the public as well as to the pocketbook of the taxpayer. Why should the social workers not devote a portion of their time and effort, as do the health professions, to instituting programs that will gradually reduce the need?

I would not have you believe that the health professions are the only ones who are critical of the theories and demands of the social workers and of their progenitors, the sociologists. Crane Brinton, associate professor of history at Harvard, discusses the question in "What's the Matter with Sociology?"[7]

> You are now close to what is chiefly the matter with sociology. Its practitioners are to an overwhelming extent partisans, improvers, preachers. Moreover, most American sociologists are facing a dilemma increasingly serious for liberals; how reconcile their libertarian, equalitarian, and democratic traditions with their growing feelings of contempt for the ordinary American, the man who tunes in on Father Coughlin, reads *The Saturday Evening Post,* or *True Story,*

throws orange peels and cigarette stubs out of his Ford, and even votes Republican? They cannot trust this man and yet they are constantly "planning" all sorts of nice things for him.

Mr. Brinton continues:

There is another, and related, trouble from which most sociologists suffer. They are so used to manipulating ideas rather than things that they come to have great contempt for all that is implied in the word "practical," a contempt which has something to do with their contempt for plain people. . . . All true science is cumulative. Physicists have something they can agree upon. Sociologists can't agree on anything. . . . If the world is afire, the tiny nozzle of sociology pointed against it may look heroic, but the stream that emerges just doesn't carry enough to do much good. . . . Sociology might be more useful if sociologists ceased to try to run the ship of state from their studies, and contented themselves with the job of making sociology a respectable science. There may be hope. After all, chemistry was once alchemy.

DENTISTRY UNDER THE F. E. R. A.

We have already had two experiences with governmentally controlled curative programs, and neither has been satisfactory to either the patient or the practitioner.

In 1933, the Federal Emergency Relief Administration established "Rules and Regulations No. 7," which provided a new pattern for rendering health service to those on the relief rolls of this country. The general policy of this program was never seriously criticized by the organized dental profession because it was early recognized that the force and extent of our economic upheaval had rendered impotent the ordinary agencies for extending relief to the indigent. Organized dentistry quickly recognized that within the policy clause of F.E.R.A. Rules and Regulations No. 7, there was contained the necessary safeguards for the continued welfare of the public and the existence of its members. I refer to the following passage[8]:

A uniform policy with regard to the provisions of medical, nursing and dental care for indigent persons in their homes, shall be made the basis of an agreement between the relief administration and the organized medical, nursing and dental professions, state and or local.

The records of the various state and local dental organizations are filled with evidence of dentistry's attempts to cooperate with state and local relief organizations in working out satisfactory methods of providing dental care to the indigent. These records should conclusively refute the statements of our critics that organized dentistry has refused to cooperate with the federal government in bringing dental care to certain groups of the population. Organized dentistry, it must be emphasized, will always cooperate with such movements provided the methods are such that it can countenance them.

Such basic considerations as permanent value to the community, preservation of the traditional patient-dentist relationship, the rendering of the same high quality of dental service as that given to private patients, efficiency in the distribution of dental relief, conservation of public funds, local responsibility for the development of details and the employment of facilities already in existence were among the many insisted upon by organized dentistry and which, therefore, became a part of most dental plans for the indigent. Before such programs became an actuality, however, there were many heated arguments between the relief commissions on one side and representatives of the dental societies on the other.

Some states, through the establishment of requirements for dental relief plans by those who did not have the essential professional experience and outlook, found tremendous difficulty in cooperating with this attempt to provide dental care to those on relief. It must be pointed out that this difficulty rested not with the

organized profession, but with outside agencies that had no right to dictate in professional affairs.

In some communities, the requirements established for giving dental relief were so weighted down with administrative, political, financial and other demands that organized dentistry found it impossible to render service under them. An attempt was made, in more than one instance, to require that relief dental service be given by dentists working on contract and selected under the watchful eye of the precinct captain or by an official of equally high standing. It is elementary that organized dentistry could not cooperate in such an unsound venture.

In communities in which the organized professions did agree to the program and did furnish dental care to those on relief, a very satisfactory result was achieved. In these cases, there has been little or no criticism of the quality of service rendered, with the proper allocation and use of funds and in the maintenance of traditional patient relationships. When these methods, however, were complicated with governmental red tape, with a chronic and an irremediable lack of funds, the desired amount of dental care was not received by those on relief.

DENTISTRY UNDER THE FARM SECURITY ADMINISTRATION

The following statement from the Bismark (North Dakota) *Tribune* of June 30, 1939 may be accepted as an appropriate and final comment on the governmental provision of dental service under the solicitous supervision of the Farm Security Administration.

North Dakota's attempt to solve the medical problems of Farm Security Administration clients through a pooling system ends at midnight tonight—termed a failure.

Walter Maddock, State FSA director and president of the Farmer's Mutual Aid Corporation, which for the last eight months has carried on the program, said the plan broke down because doctors and physicians involved were dissatisfied with financial returns.

The plan for rendering dental care through the Farm Security Administration must be considered as merely another adventure in the field of health by those who are not trained, qualified or experienced to perform the tasks involved. Under broad authority granted to the Farm Security Administration by federal legislation, it was proposed to provide medical and dental care to those who were served in other capacities by the Farm Security Administration. In theory, it was an effort to aid the needy in rural areas by providing them with a kind of voluntary health insurance. In practice, it turned out to be neither authentic insurance nor satisfactory protection against the risks of ill health.

Contracts to provide dental service were drawn up by FSA authorities and presented to individual dentists or dental societies for signature. No opportunity was afforded any one to write certain necessary precautions into these contracts. In most instances, there was little or no consultation with professional groups. These contracts contained a fee scale for which the dentist agreed to work, and these fees were usually below the normal level.

The money paid in by the people was to be used to pay the bills submitted for care under this fee schedule. If the funds were not sufficient, they were to be prorated on a percentage basis. The financial and economic standing of the people in many of these communities, combined with the hold the FSA already had on them through loans and other services, made it easy, virtually, to force most of a community into the plan. Professional practitioners, whose practices were almost entirely dependent upon rendering service to these people, could do little

more than volunteer to cooperate and therefore were literally forced to enroll in the plan. Thus, in some cases, agreements were signed between FSA and professional individuals or groups to render emergency service. In effect, this voluntary plan was consummated among farmer, dentist and FSA representative by compulsion.

When emergency care had been rendered, bills were submitted to the FSA. As is usual, when it comes to governmental payment of nominal charges for health service, funds were not sufficient to meet the total of the already reduced fees. The result was proration. In several instances, the discount thus taken by the government amounted to more than 75 per cent. In this way, a dentist who had already reduced his fee below normal was forced to accept a further reduction of 75 per cent of the lowered fee.

No gift of prophecy is needed to show that such a plan could not succeed, based as it was almost entirely on obligations which could not be fulfilled. In some states, professional societies, profiting by the experience of others, refused to sanction such an abuse of their professional services. In others, the plan was discarded after a trial, painful and expensive to those of both the public and the profession who participated.

The FSA, in short, is merely the second example of an attempt by government to render dental care without a sound basis of education and prevention. Any plan that attempts to give dental care only, without this essential basis, will either render a primitive service unworthy of American dentistry or will bog down in a hopeless morass of uneconomic, unnecessary and unjustifiable expenditures.

AMERICAN DENTAL ASSOCIATION PROPOSAL FOR DENTISTRY IN A NATIONAL HEALTH PROGRAM

From all of the foregoing, it can be readily seen that organized dentistry is definitely committed to recognition of the need that underlies the desirability of a national health program and, furthermore, that organized dentistry is more than willing to cooperate with the government in establishing satisfactory methods for dentistry's participation in such a program.

Since the need for dentistry in a national health program, however limited or expanded, is admitted, future debate must rest upon the organization, methods and personnel of such a national health program. This is the point at which the American professions and people find themselves today. All are in agreement that certain deficiencies in health service must be remedied, and almost all are agreed that some of the states are unable to perform this service without outside aid. The usual method by which outside aid is granted to a state involves the use of federal funds in a system of grants-in-aid. There has been some debate in recent times as to whether this method was established by the present administration, but even a casual examination of federal history will show that it is a time-tested practice. The Sheppard-Towner Act, previously referred to, the provisions of which were accepted by all but a few of our forty-eight states, is one striking example.

In order to allot these federal grants-in-aid to the states, it becomes necessary to have a federal agency which will manage, supervise and distribute the funds. This agency will set up certain standards to be attained by the states before this money is granted, and it will enforce a guarantee that the money will be spent in the manner designated.

Thus, the formulation of any national health program immediately proposes (1) a central agency which will allot funds, and (2) a system of federal grants-in-aid to the states. This is the basis on which, by reason of law, tradition and usage, a national health program must be constructed.

THE WAGNER BILL

The Wagner Health Bill (S. 1620), proposes federal supervising and allotting agencies and the use of grants-in-aid. As we have seen, the bill contemplates activity in six different categories of health service, which, while somewhat varied, are essentially divisions of a health service and administration. In each of these six categories, grants-in-aid will be made to the states. Therefore, it would seem most logical and efficient to establish a single agency to supervise allocation of the funds, in order to avoid duplication and waste. The Wagner Health Bill, however, does not do this, but allows final determination of the grant to rest in the hands of three distinct persons: (1) the chief of the Children's Bureau; (2) the Surgeon General, and (3) the Social Security Board chairman.

The undesirability of this arrangement is obvious. In fact, the disorganization of health and other agencies in the federal government became so apparent that the President was given power to organize various departments, with the consent of Congress, into unified agencies. It would seem natural that when this organization was brought about by executive order, all of the health agencies would be found under one administrative head. This, however, does not happen to be the case.

REORGANIZATION

By executive order, the President created a federal department of security, in which related organizations were to be grouped for greater efficiency. Paul V. McNutt, former governor of Indiana, is in charge of this department. Strangely enough, when the details of the reorganization were made known, it was discovered that the Children's Bureau, one of the most important health agencies in the federal government, was allowed to remain under the jurisdiction of the Department of Labor. It is curious that a reorganization for efficiency should allow one important group to remain outside central supervision.

It is not our purpose here to discuss the reasons for this strange situation. It is probably enough to say that political influence was not the least. At some future time, it is almost certain, the paradox thus created will be abandoned.

I quote again from the speech of Senator Robert A. Taft.

> The present bill [Wagner Health Bill] seems to me needlessly complicated. Its administration will take place under three different federal departments. Every state must adopt at least six separate plans, and for each plan there is an advisory committee, so that the bill will create approximately three hundred different boards, largely composed of laymen. Surely the federal health program ought to be consolidated under one head, and each state program ought to be worked out as far as possible under a single state department.

HEARINGS

At the hearings on the Wagner Health Bill, the examining subcommittee soon learned of the dissatisfaction of the American Dental Association with the bill in its present form. One of the Senators asked if the Association could submit a substitute plan or proposal, and this the National Health Program Committee agreed to do. At the Milwaukee meeting, therefore, the National Health Program Committee presented to the House of Delegates an outline of a plan that could be used when and if it was found necessary or desirable to enter into the formulation of a national health program.

It must be emphasized that these proposals accepted by the House of Delegates are not the final and definite requirements that must be met before American dentistry will participate in a national health program. Rather, they are a tentative basis upon which a dental program can be arbitrated between government and representatives of the organized profession. In its present form, its arrangements and provisions are almost ideal. Government, men and poli-

tics being what they are, there is little hope of the acceptance of this plan in its entirety without compromise of some sort.

FEDERAL ORGANIZATION

Since the American Dental Association had already criticized the arrangement whereby the Children's Bureau was allowed to remain outside the province of the Federal Security Agency, its first necessity was to set up a preliminary requirement of complete and effective organization of federal health service facilities. To this end, it was proposed that the Congress of the United States establish a federal department of health, with a secretary who was a graduate in medicine and who would become a member of the President's cabinet. A first assistant secretary would be a dentist. The duty of such a department of health would be to coordinate all health activities of the federal government with the exception of the military service. Because of the unique quality of these branches, it was thought best not to include them under the jurisdiction of a federal department of health. This department of health, then, would be in complete charge of all federal health activities concerned with medicine, dentistry, crippled children, etc.

In order that a proper dental program could be worked out, a federal dental council would be created under the jurisdiction of the Federal Department of Health. The first assistant secretary of the department of health would be a dentist, and he would also be the head of the Federal Dental Council. The Federal Dental Council would have an additional membership of professional, technical, social and consumer representatives. The majority of the council, however, would be nominated by the organized dental profession. In this way, the organized profession would be sure of an important voice in the dental aspect of a national health program. The Federal Dental Council would also supervise the grants-in-aid to the states. It would, however, only lay down the fundamental conditions that would have to be met by the states to get the grant: it would have no jurisdiction over the actual expenditure of the money in the state.

THREE-FOLD PLAN

Thus far, the plan has created a federal department of health, established a federal dental council and accepted the principle of grants-in-aid. The question now arises: For what is federal money to be appropriated to promote dental health in America?

It is generally accepted that it would be impossible to provide enough money to pay for all the dental work that is needed by the population. Even if this were possible, it would entail a constant expenditure, with no hope of eventual decrease unless measures were taken to prevent the same large accumulation of dental disease in the future. There are two ways to achieve this objective: (1) discover the cause of dental caries and (2), until the cause is known, teach the public preventive measures through a program of dental health education.

If this program is carried forward, and if the amount of money available for a dental program is limited, the best possible results for the nation will come from directing most of the corrective effort at the children.

The American Dental Association therefore has proposed a three-fold program in which the federal government can participate by making grants-in-aid to the state. These three activities are: 1. A comprehensive program of dental research. 2. A comprehensive program of dental education for children, parents and dentists. 3. A program of dental care (as extensive as is allowed by available funds) for dentally indigent children and adults.

RESEARCH

The federal government would make available to the Federal Dental Council a sum of money sufficient to carry on a definite program of biologic and physical research in dental science. The Research Commission of the American Dental Association is making valuable suggestions regarding the direction which this research work should take.

DENTAL HEALTH EDUCATION

While the federal government would provide money for this activity, the dental health education as well as all other activity would be carried on by agencies in the state and the community. Courses in dental health education would be provided for children, parents and teachers. This would bring the force of education to bear in diminishing the present high incidence of dental disease.

Courses would also be provided for dentists on the latest methods of preventive dentistry, as not every dentist is equipped at the present time to render efficient, competent and scientific preventive dental service.

DENTAL CARE

The American Dental Association has not set up any program, it must be emphasized, by which any and every child and adult in this country can get all of the dental care he needs or desires. No plan in the present state of finances can hope to do that. The American Dental Association plan does, however, set up a plan whereby the federal government can grant to the states certain sums of money to provide care for children and adults who are "dentally indigent."

RÔLE OF THE STATE

So far, we have been discussing the grants of the federal government to the state. What does the state, in its turn, have to do to secure this federal aid?

First, the state would have to participate financially in the plan. In other words, it would have to expend a sum of money in the state for dental purposes equal to that granted by the federal government. This method is often called the grants-in-aid system on a matching basis.

Second, the state would have to provide for a state-wide system of dental health education and of dental care for the dentally indigent.

Third, the state would have to provide those methods of administration which are prescribed by the Federal Dental Council in order to carry out these plans effectively.

According to the American Dental Association plan, the matters in the states would be handled by a state dental council, which would have a majority of members from organized dentistry. In order not to disturb existing systems already in use in the states, the officer who at present directs the state dental program would become head of the state dental council. This does not mean that the president of a state dental society would become head of the state dental council, but rather that the chief of the dental division of a state health department or some like state dental officer would become its head.

RÔLE OF THE COMMUNITY

The American Dental Association has always emphasized the necessity of allowing local communities to decide on the extent of their dental need and the methods that shall be used to meet it. This is necessary because no plan can be devised, either on a federal or on a state scale, that will meet the conditions of every local community.

The American Dental Association plan suggests that a community dental council be created which would have a majority of representatives from the organized professions. The duties of this council would be to administer the community dental program for dentally indigent children and adults. It would determine whether care is to be rendered in private offices, clinics or mobile dental units. It

would ascertain, through proper relief agencies, what persons were eligible for treatment. It would determine the fees for dental operations and the salaries to be paid to employes, basing its decision on the standard of living in the community. It would decide whether the dentist was to be paid for such care, on the basis of the individual operation, on the number of patients cared for or on a straight salary. It would set the standards that must be met in the quality of dental care rendered the patient.

Thus the American Dental Association has brought right into every community a mechanism by means of which the dentists can control the methods by which dental care is to be provided in the community. If necessary, this mechanism can be expanded to care for the entire population, if enough funds are ever available for this task.

Already many states are organized along these lines. They should continue to perfect their organizations, so that they will be ready for any emergency or any legislation that arises. Local dental societies should organize their relations with the public along the lines suggested for the community dental council, so that they will be able to take a hand in this important task if the need arises.

But apart from legislation and apart from any threat of a compulsory insurance system, the organization suggested by the American Dental Association for the state and community will be extremely helpful in building a sound dental organization. Through it, a more competent dental service to the indigent can be rendered, and plans of dental prevention and research can be perfected.

It must not be our idea that if the legislation which is at present before the Congress perishes, all of these efforts will also perish. The program suggested by the American Dental Association is fundamental to the dental health of the American people. No legislation should be necessary to secure and maintain our interest in that. The National Health Program Committee has attempted to work out a plan by which that interest can be made beneficial both to the public and to the profession.

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RADIODONTIA FOR THE GENERAL PRACTITIONER

By James P. Coupland, D.D.S., Ottawa, Canada

IN this twentieth century, there is a tendency to become so preoccupied with the problem of making a livelihood that the fine art of living is apt to be neglected. Since a dentist gives the best part of his life to his practice, more consideration should be given to making the hours spent in the office as pleasant as possible. Early in our dental experience, we learn how greatly failures detract from the enjoyment of our work. Conversely, elimination of the disappointing cases can contribute greatly to our peace of mind. The purpose of this paper is to demonstrate how much grief can be obviated by routine use of the radiodontic service.

DETECTION OF CARIES

In the field of operative dentistry, it is most disconcerting to realize that undetected caries has been allowed to progress in the mouth of a patient who has been reporting faithfully every six months. The patient has been educated to believe that regular visits would ensure him freedom from serious trouble. And then a cavity manifests itself, probably by a toothache. From time to time, this will occur, if radiodontic examinations are not made periodically, since as all practitioners should recognize, the x-rays offer the only means of detecting certain obscure cavities. Figure 1 illustrates varying degrees of proximal caries which may be disclosed by a bitewing radiogram. On the distal surface of the lower first bicuspid, the mesial surface of the lower second bicuspid and the mesial surface of the lower second molar are areas of incipient decay (caries of the first degree).* Figure 1 also shows caries of the second degree in the distal surface of the upper first molar, in the mesial and distal portions of the upper second bicuspid, in the distal surface of the upper first bicuspid and in the distal surface of the lower first molar. The cavity in the mesial surface of the upper second bicuspid has almost involved the pulp, and yet the break in the enamel from which it originated is small enough to defy detection by ocular or instrumental inspection. It is submitted that the value of the x-ray survey in this connection alone is sufficient justification for advising the examination, even if no other information is obtained.

It is particularly unfortunate when recurrent caries is allowed to progress under bridge abutments. These restorations require special care for proper maintenance. In Figure 2 can be seen the results of neglecting the decay under an inlay in a lower molar. Septic degeneration of the pulp is evidenced by the radiolucent area at the apex of the distal root. An earlier examination would have prevented this condition, which represents both a physical and an economic loss to the patient.

An x-ray check-up after the operative

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*Classification of caries as recommended by the Committee on Nomenclature of the A.D.A. in the 1937 report.

work is completed is wise. The most ardent inlay advocates admit the possibility of defects occurring at the gingival margins of inlays made from a wax pattern. Occasionally, a deficiency in the casting will be disclosed. Overhanging cervical margins are found more frequently on amalgam fillings. An excess of cement in the proximal space, as illustrated in Figure 3, between the molars is another fault the postoperative picture may show which otherwise might be overlooked. If allowed to remain, this cement constitutes a serious irritant to the gingival tissues.

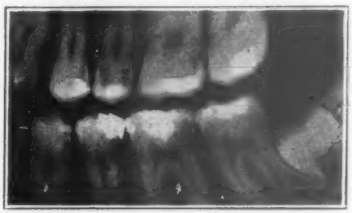

Fig. 1.—Evidence of caries of first and second and approaching third degree.

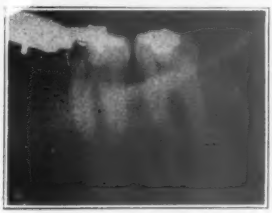

Fig. 2.—Recurrent caries under bridge abutment extending into pulp chamber, with resulting periapical involvement.

Interproximal radiograms made with bitewing films are valuable adjuncts to an examination. However, they should not be used to the exclusion of the periapical views. The accompanying illustrations show an instance in which the periapical view disclosed caries which the bitewing film taken at the same time did not. In Figure 4, the cavity on the mesial surface of the upper second molar is not evident in the bitewing view of the area. (Fig. 5.)

Of course, the converse of this situation is more frequently true, that is, the interproximal radiogram (Fig. 6), being taken with a more horizontal angle of projection, shows gingival caries to better advantage than the ordinary picture. (Fig. 7.) The bitewing picture may be deceptive in another respect. A tooth that appears vital may be found to be pulpless when an examination of the apical tissues is made. For example, from the picture in Figure 8, one would never suspect that the lower second bicuspid was unhealthy, as shown in Figure 9.

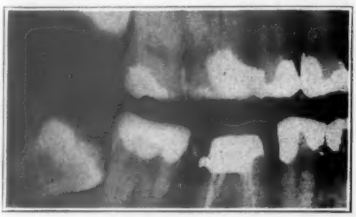

Fig. 3.—Excess cement in the interproximal space between lower first and second molars.

Fig. 4.—Periapical view showing large cavity in mesial aspect of upper second molar.

PULPITIS

Pain resulting from pulp degeneration, a source of great discomfort to the patient, is a cause of embarrassment to the dentist. It may be of long duration and, as often as not, the origin is obscure. Careful consideration of both the radiographic evidence and the clinical symptoms is necessary to locate the source of the disturbance. In these cases, it is imperative that the radiograms possess the finest technical qualities because the evi-

dence of the trouble is usually very slight. In some cases, particularly in the early stages, no change can be detected radiographically. This limitation of the x-ray service should be admitted frankly to the patient. It is not difficult to explain to a person of average intelligence that if no change in the tissues takes place before the exposure is made, there is no reason to expect the x-rays to locate the trouble. It should be pointed out that there is usually a departure from normal which, when recorded on the radiogram, indicates definitely where the disturbance is centered.

Fig. 5.—Bitewing radiogram of area shown in Figure 4 which failed to disclose recurrent decay in second molar.

Fig. 6.—Bitewing film showing cervical caries in distal aspect of upper second bicuspid.

Typical evidence of septic pulp degeneration is an apical thickening of the periodontal membrane as illustrated at the root end of the lower molar in Figure 10. This degenerative change is not necessarily accompanied by any symptoms; hence, constant vigilance must be exercised so that teeth thus affected will not be overlooked. Simpson,[1] who has consistently maintained a sane attitude on the focal infection question, has expressed the opinion that, as potential foci of infection, such teeth constitute a greater menace than devitalized teeth of long standing.

DEVITALIZATION

Needless loss of vitality in the tooth of a patient who has entrusted his well-being to a dentist's care must cause the conscientious operator grave concern. Unfortunately, this may occur if periodic x-ray examinations are not made, to reveal hidden cavities before pulp involvement takes place. A mishap that is equally embarrassing is an accidental exposure of the pulp in preparing for a restoration. In this connection, a preoperative radiogram is useful to determine the size, shape and location of the pulp, which, contrary to the impression given in dental anatomy classes, is subject to surprising variation. Not only does the size vary between children and adults, but also there may be a difference in persons of the same age. Figure 11 illustrates one extreme in which the pulp chamber and root canals of the upper central incisor are completely ob-

Fig. 7.—Periapical view of area shown in Figure 6 which failed to disclose gingival decay.

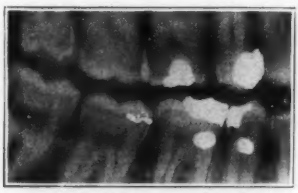

Fig. 8.—Bitewing radiogram suggesting that all teeth included are vital.

literated. Figure 12 shows unusually large pulps in a patient over 40 years of age.

When the history of North American dentistry of our day is written, it will relate that the end of the first third of the century saw a definite decline in the anti-pulpless tooth craze which prevailed during the first three decades. Reports in the current literature by Johnston,[2] Grossman[3] and other investigators are encouraging us to take a more conservative (I should like to say rational) view of the pulpless tooth problem. This is in decided contrast to the situation of a few years ago, when devitalization had few champions. Now, most of us will agree that there is a place for root-canal treatment. Just as the x-rays were to a large degree responsible for the wholesale condemnation of devitalization, so they have become the basis of justification of the procedure. When, several months after treatment has been completed, a clear x-ray picture can be produced showing the root canal mechanically filled to or near to the apex, the periodontal membrane with no abnormal thickening and the lamina dura and other periapical bone normal, it will be generally conceded that there is little reason for suspecting the pulpless tooth as a possible source of infection. The possibility of irregularities in the root formation as illustrated in Figure 13 makes it advisable to have an x-ray picture taken before treatment of a tooth is started.

Fig. 9.—Periapical view of case shown in Figure 8, disclosing non-vital second bicuspid.

Fig. 10.—Evidence of pulp degeneration at apex of mesial root of lower first molar and fourth degree caries under inlay in same tooth.

PERIODONTOCLASIA

Failure to observe periodontoclasia is an oversight against which practitioners in every branch of dentistry must be constantly on guard. All too often, extensive restorative work is done on teeth the alveolar support of which is impaired. When a patient discovers that a well-established pyorrheal condition has been overlooked, his confidence in his dentist is naturally shaken. Since radiodontists with referred practices are repeatedly confronted by this situation, for the general practitioner's protection as well as the

Fig. 11.—Complete obliteration of pulp chamber and root canals in upper central incisor by deposition of secondary dentin.

Fig. 12.—Large pulps in patient over 40 years of age.

patient's welfare an x-ray examination must be recommended. Periodical examination is necessitated by the fact that alveolar destruction may progress with unexpected rapidity. Usually, periodontal disturbances are generalized throughout the mouth, but they may occur in isolated pockets, as shown in Figure 14. Some common causes of isolated pockets are defects in restorations, such as faulty proximal contours and overhanging gingival margins.

Fig. 13.—Upper lateral incisor with irregular root.

Fig. 14.—Isolated periodontal pocket on distal aspect of first molar.

Unfortunately, many dentists, and probably the majority of laymen, consider that periodontal treatments are unsatisfactory. There is some justification for this attitude, since many have had disappointing experiences. Some of the failures result from inadequate instrumentation, while others arise from faulty diagnosis. In the latter, the radiographic evidence is indispensable. By disclosing etiologic factors such as gingival irritants and traumatic occlusion, the radiogram suggests a course of treatment. Box,[4] Merritt[5] and other authorities believe that periodontal lesions may have systemic significance. This attitude is in contrast to the carelessness with which pyorrhea was formerly regarded.

Occasionally, serious local developments may arise from periodontal lesions. Nyman[6] recently reported a case of widespread osteomyelitis of the maxilla of pyorrheal origin. Another periodontal lesion that has a tendency to extend is the pericoronal sac found on the distal surfaces of mandibular third molars. When making an x-ray examination of this area, it is always advisable to include the bone distal to the third molar, as shown in Figure 15. In Figure 16 is seen the extent to which these crypts may develop when, as occasionally occurs, they become cystic.

Fig. 15.—Pericoronal sac on mandibular third molar.

Fig. 16.—Pericoronal sac which developed into cyst.

Traumatic occlusion, in rare instances, causes periapical bone rarefaction, which can easily be mistaken for involvement of septic origin. The area shown in Figure 17 at the apices of two lower incisors was found in December 1936. When reference was made to a former picture taken for the patient in January 1935, the periapical tissues were normal. The affected incisors responded normally when the electric pulp-test was applied. It was sug-

gested that some change might have taken place in the occlusion, and it was learned that considerable operative work had been done in the interval. Correction of any occlusal trauma was recommended, and sixteen months after this had been done, the picture in Figure 18 was taken. Almost complete regeneration had taken place.

CHILDREN'S DENTISTRY

Routine radiodontic examinations can

Fig. 17.—Bone rarefaction at apices of lower incisors resulting from traumatic occlusion (taken December, 1936).

Fig. 18.—Case shown in Figure 17; April 1937, sixteen months after incisal trauma was relieved. Bone regeneration is evident.

be made advantageously for the child as well as the adult patient. Their value in disclosing proximal caries has already been discussed. In addition, abnormalities interfering with normal development of the dentition, such as cysts, odontomes and supernumerary teeth (Fig. 19), may be present. Periapical infection at the roots of deciduous teeth sometimes arrests development of the underlying permanent tooth follicles, as illustrated in Figure 20. Hence, for local as well as systemic reasons, there is objection to the retention of septic deciduous teeth.

EXTRACTIONS

There are certain extraction cases which it is unwise for the general practitioner to undertake if he has access to the services of an exodontist. An x-ray exami-

Fig. 19.—Supernumerary tooth interfering with eruption of central incisor.

Fig. 20.—Eruption of permanent incisor delayed by presence of septic deciduous tooth. The relation of the unerupted central incisor follicle is to be noted.

nation is the best means of selecting the cases in which difficulty can be anticipated. Teeth with exostosed roots or other abnormalities can thereby be discovered. Figure 21 shows an unsuccessful attempt to remove an impacted lower molar. The crowns of both the third molar and the adjoining molar have been broken and a localized osteomyelitis has developed around the former. One ex-

perience like this will cause the operator more worry and actual financial loss than would be offset by a number of cases which were concluded more successfully.

RADIODONTIC TECHNIC

It is possible for failure to occur in the radiodontic service as well as in the other departments of dentistry. The best insurance against trouble in dental radiography is consistent production of technically excellent pictures. A poor radiogram may be worse than none; for it may be definitely misleading. Every picture should be criticized for technical deficiencies, and if it fails to meet the requirements, it should be retaken. In Figure 22 is reproduced a picture which at first glance seems fairly good, but, on closer inspection, it is found to be defective in that the apex of the second molar is obscured by superimposition of the malar bone. By a slight change in the angle of projection, this defect was corrected and an unobstructed view (Fig. 23) of the root end was obtained. The latter picture yielded evidence of apical involvement. This case illustrates that even a slight change in the technical procedure may be sufficient to afford important information.

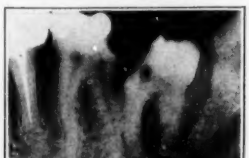

Fig. 21.—Unsuccessful attempt to remove an impacted third molar. There is localized osteomyelitis around the area of impaction and injury to the second molar.

Fig. 22.—Film which failed to meet technical requirements because apex of second molar was obscured by superposition of malar bone image.

CONCLUSION

An attempt has been made to demonstrate that much of the difficulty encountered in the practice of dentistry can be prevented by routine use of the radiodontic service.

The improvement in a dentist's professional services that will result from intelligent application of the x-rays will undoubtedly be reflected in the financial success of his practice. What is also an important consideration to him is the fact that many of his worries will be eliminated.

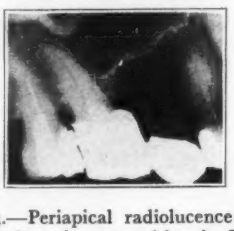

Fig. 23.—Periapical radiolucence disclosed by elimination of superposition in Figure 22.

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DENTAL PROBLEMS ARISING DURING PREGNANCY

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"A TOOTH for each pregnancy" is presumed to be a factual statement, since it has apparently survived the test of time. However, pregnancy can be so managed as to introduce a new dictum, "Healthy teeth with all pregnancies." There must be etiologic factors in dental disease during pregnancy, and, in my opinion, the most important etiologic factors are improper diet, disease complicating pregnancy and, last but not the least, endocrinologic imbalance during pregnancy.

Every up-to-date and well-trained dentist knows the importance of diet, especially during pregnancy, in the maintenance of sound teeth. However, it does no harm to review a subject which is so important. There is no other time when the diet should be so well chosen as in pregnancy. Granted that the fetus is in effect a parasite that takes from the mother's blood only that which it needs for its development, it follows that the pregnant woman who has sufficient and proper nutriment in her blood stream to supply the needs of the rapidly developing fetus will endure the strain of pregnancy with the minimum amount of damage to the body tissues. One should not assume that the patient eats sensibly just because she appears strong. One should remember that the majority of women in the first pregnancy are young and that youth is so strong that Nature appears kind.

Read before the Section on Medical Relations of the Seventy-Fifth Annual Midwinter Meeting of the Chicago Dental Society, February 14, 1939.

Adair states that a pregnant woman requires a diet so varied that she will receive in the necessary amounts proteins, fats, carbohydrates, vitamins and minerals such as iron, calcium and phosphorus. The diet should be sufficient to build her body tissues to full strength and to accomplish this without a marked storage of fat.

The minimum protein requirement must be maintained. The tissue proteins are probably harmful in certain conditions, as in toxemia, which arises frequently during the latter months of pregnancy. Proteins are found largely in lean meats, eggs, fish, milk and its products, wheat and vegetables such as peas and beans. Carbohydrates are found chiefly in milk, cereals, bread, potatoes, rice, honey and sugar. Fats are obtained in cream, butter, oils, fat meats and cheese.

Minerals, the chief building material for bones and teeth, are, with meat, an important source of iron, to supply hemoglobin. Foods of high mineral content are therefore desirable and are probably the best means of administering inorganic salts. These are found in milk, certain vegetables and fruits. The best calcium-containing food is milk or skimmed milk products, but calcium is obtainable also in beans, peas, cauliflower, dandelion greens, green figs and oranges. Iron is obtained from beef liver, oysters and spinach, and less readily from eggs, potatoes, codfish, herring, tomatoes, peas, lettuce, dates, prunes and strawberries. The vitamins are found in milk and its products, meat, eggs, whole wheat cereals, vegetables, fruits and cod-

liver oil. With such a wide distribution of food elements, meals can be appetizing as well as wholesome.

There is no reason why a normal pregnant woman should not eat meat in moderation, notwithstanding an old superstition to the contrary. Modern investigation has shown that much more harm is done by using much table salt for seasoning and by eating highly spiced foods and articles of diet known to be indigestible than by eating large quantities of meat.

Cutting down on sugars and fats during pregnancy is a sensible precaution as long as there is enough carbohydrate or fat in the diet to furnish necessary energy. Bulk to combat constipation, except in spastic constipation, as well as to supply needed food, is best obtained from vegetables and fruits.

Desserts should be of fruits, not pastry. Coffee, tea, alcohol and smoking are all undesirable during pregnancy and should be reduced to the minimum.

Twelve years' experience in obstetrics has emphasized for me the importance of diet in maintaining sound teeth during pregnancy. At the Cook County Hospital prenatal clinic during a period of twelve years, I have studied three groups of pregnant women as regards diet and teeth. In the first group, the diet contained plenty of milk, raw fruits and vegetables and cooked vegetables. In the second group, there were very little, if any, fruit, vegetables and milk in the diet. In the third group, the diet contained plenty of cooked vegetables.

In the first group, the condition of the teeth and gums was usually excellent, as one would expect. In the second group, it was very poor, there being many carious teeth and swollen and bleeding gums. In the third group, in spite of a diet containing ample amounts of cooked vegetables, the teeth and gums were in very poor condition. During the first few years of this observation, I could not explain to my satisfaction the etiology of poor teeth and gums in the presence of plenty of cooked vegetables in the diet. However, when these patients were interrogated relative to the length of time the vegetables were cooked, the cause for the poor dental condition became clear. The vegetables were cooked from three-quarters of an hour to an hour and a half. Cooking vegetables for that length of time is enough to destroy all the vitamins and cause a precipitation of the minerals into the water, which was subsequently discarded. These women, therefore, were not obtaining the food elements which they so much needed. Hence, it is my practice to instruct all pregnant women to make sure that vegetables are not overcooked and to eat plenty of raw vegetables and fruits daily, and in addition to eat liver at least once a week, for its iron content in order to combat the anemia prevalent during normal pregnancy, and to eat fish and seafoods, for their iodine content, twice a week. Two pints of milk every day and two capsules of dicalcium phosphate with viosterol daily are prescribed.

It is hardly necessary to emphasize the important rôle that the vitamins play, not only in the maintenance of sound teeth and gums, but also in assuring a normal pregnancy, since hypovitaminosis is generally accepted by the dental and medical professions as a definite cause of dental caries and gingivitis and of many obstetric complications.

According to DeLee, it would be surprising if a condition which causes such marked local and general changes as pregnancy does should be completed without the production of conditions that might be considered pathologic. Pregnancy does not confer immunity against any disease. On the contrary, it makes the woman susceptible to certain general diseases and almost always aggravates existing general, and especially local, affections. Only rarely do we hear that patients feel better during preg-

nancy. The majority suffer more or less discomfort.

Since pregnancy normally causes a marked and spectacular change in the entire organism, it is evident that it is a drain on the system. If the prospective mother can supply all the wants of the fetus, she will remain well. If she herself is not furnished with all the elements required, she will suffer inanition or incompetence of one or more organs or functions of the body.

If normal pregnancy is a drain on the entire organism, what effect will any complications of pregnancy such as pyelitis, nephritis, pneumonia, syphilis and tuberculosis have upon the general organism? These other complications have a marked deleterious effect on the entire organism.

HYPEREMESIS GRAVIDARUM

A complication occurring during the early months of pregnancy to which the medical and dental professions should give more attention is hyperemesis gravidarum, or what is ordinarily called pernicious vomiting of pregnancy. Fifty per cent of all pregnant women are subject to nausea and vomiting during the early months of pregnancy, in some cases moderate, in others severe. It has been stated, and the entire dental and medical professions are in unanimous accord, that a well-balanced diet with plenty of vitamins and minerals is of utmost importance. But here we have a condition in which not only is the required food rejected, but also the stomach empties itself of its own gastric juice. Eventually the entire system is drained, dehydration and acidosis (an acid condition of the blood) resulting. When this occurs, the patient lacks fluids and suffers loss of energy from deprivation of carbohydrates, fats, proteins, minerals and the vitamins. Vomiting begins about the sixth week of pregnancy and may last through the third or fourth month of pregnancy. Is it any wonder that so few women are perfectly healthy during pregnancy or that it usually takes so long for recovery from childbirth?

Just at the time (the fourth month) when the fetus begins to make great demands for calcium, phosphorus, iron and other minerals, the system is found lacking in these important elements, which it lost during the vomiting period. It would be logical, therefore, to assume that the vomiting of this early period of pregnancy, plus the increasing demand of the fetus for minerals, is the cause of tooth decay in the early months of pregnancy. Consequently, any vomiting occurring during pregnancy should be considered serious and must be immediately and quickly checked to avoid this unnecessary and disastrous condition.

What is the cause of this vomiting and what can be done to check it? The exact cause is unknown, but it is presumably a toxemia due to pregnancy. Like vomiting occurring during the nonpregnant state, it may have many etiologic factors. Obstetricians classify vomiting of pregnancy as of three types:

1. The neurotic type, which includes the cases in which there is a nervous imbalance.

2. The toxemic type, which, if untreated or neglected, may result fatally.

3. The type in which vomiting is produced reflexly because of an infection of the teeth or tonsils, erosion of the cervix, infection of the kidneys, etc.

Details of the treatment for hyperemesis gravidarum would require too much time here. In general, the patient should be placed in bed immediately. A sedative should be given regularly, and meals should be served in bed. If the vomiting persists, the patient should be transferred to a hospital. She should have very few visitors, in some instances not even the husband being allowed to visit her. Sedatives should be continued. Should the vomiting continue, it may be necessary to discontinue all intake of

food by mouth. Fluids in the form of glucose and salt solution are administered by rectum, subcutaneously or intravenously. Nearly all patients will respond to treatment if orders are rigidly enforced.

If the appetite is perverted toward harmful foods, such as excessive amounts of carbohydrates (sweets, desserts, etc.), fats and proteins, and highly seasoned foods, the unnatural craving must be corrected.

The lactating period is not infrequently given less attention than the prenatal period, as far as maternal diet and infant feeding are concerned. During pregnancy, as mentioned previously, a well-balanced diet with plenty of vegetables and fruits and of high vitamin and mineral content is highly desirable. However, seldom is there emphasis on the importance of a similar diet during lactation.

It is generally conceded by the leading pediatricians that breast feeding is superior to artificial feeding, since breast milk contains the elements of paramount importance to the baby. Therefore, if the diet is important prenatally, it is just as important during the lactating period, not only for general health, but also for dental prophylaxis.

All dentists and physicians are acquainted with the following types: the tall lean boy or girl with a minimum amount of sexual development; the fat, chubby, overdeveloped; the short thin, and the short fat ones, as well as the gigantic and acromegalic types with extremely large features, including jaws and extremities. In such cases, the abnormality results from disturbances of the endocrine glands. The abnormality of various types due to the imbalance of these glands is known as endocrinopathy.

The orthodontic phase of juvenile endocrinopathy is less important than that of the infantile. If the dental defects due to endocrinism were properly corrected during infancy or during the prenatal period, there would be relatively few abnormalities of the second dentition. More important than early diagnosis and adequate treatment of infantile endocrinopathy is prenatal prevention of their occurrence. If a prospective mother has a personal history of thyroidism and indications of a lack of thyroid response during pregnancy, possible endocrinopathy affecting the infant *in utero* should be suspected.

REPORT OF A CASE

A case in point is that of a housewife, 35 years old, who was seen in June 1926, at which time she was four months pregnant. She had given birth to two defective infants, boys, who were living, six premature infants and two monsters, born dead. Her complaints at this time were extreme nervousness, vertigo, dyspnea, edema, cardiac palpitation, belching, bloating and pain in the right lower quadrant which had been present since her marriage, 18 years before. For six years, there had been menstrual irregularity. Medical advice was sought because of her repeated failure to have a normal child. The last two conceptions had resulted in monsters, born dead owing to their size. The two living children each had weighed 10 pounds at birth. Examination of these boys at the ages of 11 and 12 (1926) demonstrated in both a thyropituitary deficiency. Six conceptions had terminated in miscarriages.

After a study of the case, desiccated thyroid, 0.75 to 1.5 grains daily, and a pituitary extract, 1 cc. every third day, were prescribed. Under this treatment, the patient progressed favorably during pregnancy without the unusual gain in weight or the severe symptoms and migraine which had complicated the two previous pregnancies. In anticipation of the birth of another overweight baby, it was agreed that a cesarean section was justifiable. The last two deliveries had been hazardous to the mother and fatal to both infants. This operation safely delivered the mother of a 7 pound, 8 ounce baby free from physical abnormalities. Roentgenograms of the infant's knee and ankle taken soon after birth revealed normal osseous centers. During the three succeeding years, growth and development have been normal. The child is now 12 years old.

What additional treatment can be given to patients presenting the following dental problems?

1. Soft teeth with a tendency to decay, despite a well-balanced diet with plenty of vitamins and the necessary minerals taken for a reasonable length of time.

2. Irregular or malposed teeth remaining unchanged despite an ideal diet and the use of mechanical appliances.

3. Delayed dentition in children in spite of proper dental care.

The late William Englebach, professor of medicine at St. Louis University and a pioneer endocrinologist—in my opinion, at least twenty-five years ahead of his time—ably answered these questions in the following statements.

The normality of the permanent teeth, the eruption of which begins at the sixth year and continues to the twelfth, depends largely on the eruptive age and growth progression of the deciduous teeth. When the first set does not erupt properly, there is malalinement of the permanent teeth. Late eruption of the deciduous teeth is primarily due to thyroid deficiency in infancy. This deficiency, if not severe, is often overcome by a natural process so that, at the time of the beginning eruption of the permanent denture, the growth process under thyroid and pituitary influence has been restored to normal. Restoration of endocrine equilibrium assures normal eruption, structure and size of the permanent teeth. Early thyroid inactivity, however, by retarding the deciduous dentition, delays exfoliation. Retention of the deciduous teeth a year or two beyond the normal age, in consequence, causes malposition of the permanent teeth if they attempt to erupt at the normal age. The retained deciduous teeth displace the permanent teeth anteriorly or posteriorly to the line of occlusion or cause irregularity and malposition, affecting particularly the upper and lower incisors and canines. In thyropituitarism, in which deficiency of the anterior lobe of the hypophysis has been added to thyroidism, the underdevelopment of the malar bone resulting from undersupply of the pituitary growth hormone is an additional factor in malalinement.

On the other hand, too rapid growth or overdevelopment of the maxillary bones causes separation of the teeth, which, though correspondingly large, are not of sufficient size to occupy the added space resulting from the unusual bone growth. In pituitarism and in pituitothyroidism with secondary gonadal deficiency, the upper lateral incisors and canines are often very small as compared with the central incisors and in some instances are congenitally absent. Roentgenograms of the tooth buds may demonstrate unerupted teeth which should have been projected through the gums many years previously. The importance of the thyroid function in tooth bud differentiation and development, and of the hypophyseal growth hormone in the development in structure and size of the teeth, corresponds to the influence of these respective hormones and skeletal ossification. Confirmation of dental retardation by the orthodontist is possible by comparison of roentgenograms of the osseous centers with the age. This procedure would be of great help in determining an endogenous source of dental malformation, in addition to or in lieu of an infection or dietetic factor, to which this is attributed. This undoubtedly would alter the mechanical basis for treatment, so assiduously followed by most orthodontists.

The decalcification of teeth so frequently seen at an early age requires investigation referable to calcium deficiency, as associated with parathyroid, thyroid and pituitary disorders. Estimation of the serum calcium or calcium balance would be of value. However, spasmophilia, tetany, rickets and other deficiency diseases are rare as compared

with the prevalent thyroid or hypophyseal endocrinopathy. The thyroidism and secondary gonadism of late juvenility probably account for the disturbance in calcium metabolism affecting dentition at this age. It has been shown that the thyroid and gonads have a decided influence upon calcium metabolism. Treatment has demonstrated that a different dental development and structure are produced by replacement of their hormones.

All dental defects are not to be interpreted as of endocrine origin. Endocrine function is a positive factor, in conjunction with others, such as food intake, infection, oral hygiene, mechanical effects and trauma. It has been shown that when an endocrine condition, such as a thyroid or thyropituitary disorder, is present, a combination of other methods of therapy does not have results comparable in some instances to endocrine replacement alone.

When patients with soft, irregular or malposed teeth or delayed dentition do not respond to the conventional treatment instituted by the dentist, a thorough examination should be made by a competent endocrinologist and proper treatment instituted.

A word or two may be said regarding the use of anesthesia during pregnancy. A local anesthetic may be administered at any time during pregnancy except in the presence of acute inflammation of the jaws and gums in women who have an idiosyncrasy to the anesthetic.

The obstetrician employs a general anesthetic at any period of gestation when it is necessary in making a vaginal examination, and in opening a breast abscess, performing an appendectomy or removing a tumor which interferes with pregnancy. A general anesthetic may be administered to women early or late in pregnancy provided the indication for dental intervention is imperative; but the work should be done in the hospital.

Extraction under local or general anesthesia should be carried out cautiously from the sixth week to the third month of pregnancy. When the patient is vomiting excessively, it would be wise to delay extraction until the vomiting ceases and the general health is reestablished. It is also wise to defer extraction of teeth in the last month of pregnancy to the late postpartum period, unless decay would lead to greater damage.

SUMMARY

A pregnant woman, in order to preserve her general health and her teeth, and to give birth to a healthy baby, should adhere to a well-balanced diet.

She should visit her dentist at least twice during pregnancy.

A balanced endocrine system is necessary to insure normal dentition of the offspring.

Closer cooperation between the dentist and the obstetrician would definitely revise the statement "for each pregnancy, a tooth."

It should be more generally recognized that the period of pregnancy is of paramount importance to the unborn child as regards bone and tooth formation.

Special and rigid care should be given in the complications of pregnancy, particularly hyperemesis gravidarum, or vomiting of pregnancy.

It would be ideal if women were examined by the dentist and obstetrician prior to and regularly during pregnancy.

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MAXILLARY SINUSITIS AND OBSCURED PARTIAL IMPACTION AS CAUSES OF DENTAL PAIN OF UNDETERMINED ORIGIN*

By JOSEPH D. BERKE, D.D.S., New York, N. Y.

MORE than 95 per cent of the patients coming to a dental office for the relief of pain are suffering from some disturbance of the teeth or periodontal tissues the nature of which can be disclosed by careful clinical and roentgenographic examinations. Most of such complaints are sequelae to carious and pyorrheic processes. Other conditions, such as the impaction of teeth, the presence of cysts or retained roots and infection of the gingiva and alveolus, occur with frequency. These conditions are well known to the practitioner, and each has a specific treatment. Bloodgood[1] (1932) reported a series of cases in which malignant growths were first noted by the patients as ordinary dental pain associated with infected and loose teeth.

Pulp stones[2, 3] have also been discussed as a cause of pain around the teeth and reflex pain referred to different regions of the head. These stones are seen with great frequency in histologic study of the pulp. They occur in the teeth of the young and the old, especially if there is caries or periodontal disease. Pain in the latter condition is related to the perio-dontal disease rather than to the calcific deposit. It is a common clinical experience to find that such teeth are far worse than the roentgenogram suggests.

Another point that deserves consideration is the method of diagnosis of pulp stones. The roentgen rays pass through a densely calcified enamel cap and a less calcified but thicker dentin core. Pulp stones are infrequently of such size as to be obvious clinically. Many "pulp stones" shown in roentgenograms are really molars having concave pulpal walls and sharp pulp horns so that there is opacity in the center of the pulp chamber. Further, superimposition of shadows cast by the bifurcation of roots and orifices of root canals cannot be avoided owing to the angulation of the x-rays and film, and may also lead to misinterpretation. The lack of evidence in the literature and the ineffectiveness of the procedure in practice do not warrant the extirpation of the pulp or the extraction of apparently good teeth because of the presence of pulp stones.

In a number of cases seen, the patient complains of pain, but the clinical and x-ray examinations of the teeth and alveolar process are negative. These cases are usually classified as neuralgia or

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designated as a disturbance of non-specific origin. There are two distinctly different types: 1. Major neuralgia, or tic douloureux, which is an extremely acute attack of pain of characteristic nature and onset. This condition has been described fully in the literature. Although the elimination of the pathologic process is indicated, it is conceded that definite dental disease bears no relationship to the ailment. 2. Minor neuralgia, which includes a heterogeneous group of pains and discomforts, varying in duration, intensity and character. In studying a series of these cases, I have found a distinct etiology and treatment for several varieties of complaints. The causative agents in these conditions are: (1) acute or chronic inflammation of the maxillary sinus, and (2) obscured impaction of one or more teeth.

INFLAMMATION OF THE MAXILLARY SINUS

The intimate anatomic relationship of the upper molar teeth and the antrum is evident to the dentist. On the extraction of these teeth, a direct communication with the maxillary sinus is often found. In many instances, there is no continuous *lamina dura* about the roots of the maxillary molars.[4, 5] In these cases, the apices project into the antral cavity and are covered by mucoperiosteum only. It is not surprising to find numerous reports concerning infections of the maxillary sinus due to disease of the dental tissues.[6, 7, 8, 9] Considering the juxtaposition of the alveolar process and the antrum, a reversal of the situation in which the sinus causes dental disease is possible.[10, 11] Brophy[12] (1918) found that empyema of the antrum was often preceded by localized pain in a tooth; also, that the pain may be a neuralgic type, extending over the head, face and neck.

Twenty cases are reported here. Concomitant dental discomfort is experienced by many sinus sufferers. The important fact in this series is that the first symptom was an oral one, and a dentist was first consulted.

The patient usually complains of a dull but sometimes an acute pain about the molar and bicuspid teeth of the affected side. The duration varies from days to weeks. As a rule, it is described as a constant toothache or neuralgia. The upper second bicuspid and first and second molars may be sensitive to percussion. It is this symptom that suggests pericementitis due to pulpal disease, and it undoubtedly confuses treatment. Dental x-ray examinations and pulp tests disclose no pathologic condition. It is important to note that the extraction of one or more teeth gives some relief in these cases. Relief so obtained is only temporary and may expose the antrum to further infection through the mouth. Such procedure also may result in a fistulous communication with the oral cavity. The diagnosis of these conditions is not a simple matter. The history of the case is not always helpful, only one of the patients in this series having had sinus trouble previously. Careful questions may disclose a fairly severe cold of recent date and sometimes lead to the admission that, since that time, the teeth of that side have not felt quite comfortable.

The following case illustrates the difficulties that are encountered in the diagnosis of such conditions.

B. H., a man, aged 25, complained of a toothache of several days' duration. The area around the left maxillary molars was particularly painful. The first molar was very sensitive on percussion. The roentgenographic examination was negative. The clinical picture was characteristic of sequelae to infection and necrosis of the pulp. When tested for vitality, the tooth was found to be practically normal. It was only slightly more sensitive to heat than normally. The patient had had a cold several weeks prior to the dental complaint. At the time of the examination, there was no impairment in breathing nor was there any evidence of a cold. It was disclosed, however, that, prior

to this visit, the patient had experienced pain in the left frontal region. A medical check-up disclosed no serious antral disease. In order to rule out any primary dental disease as causing the discomfort, the patient was advised to return in two days. During this interval, all symptoms subsided spontaneously. There was no further complaint until three months had elapsed. At that time, the patient came in with an extensive swelling of the cheek and a severe ache in the upper left molar region. The alveolar gingiva about the buccal portion of the first molar was raised, but there was no pointing of pus. All of the characteristics of an acute alveolar abscess were present. There was a marked pericementitis of the upper left first molar. The clinical symptoms made the diagnosis of several months previously seem a stupid blunder. When tested, the pulp of the affected tooth was found to have the same normal reaction as was observed at the first visit. The pus of the infected sinus had burrowed through the thin outer wall of the body of the maxilla and had become localized in the mucobuccal fold of the first molar area. The patient was instructed to use ice applications for fifteen minutes of every half hour. The next day, the swelling was somewhat reduced (Fig. 1) and there was distinct pointing of the abscess intraorally. On incision, about 1 cc. of pus was discharged. The patient was referred for treatment. The diagnosis of maxillary sinusitis was confirmed, and the entire condition cleared up uneventfully. The molar involved is still vital and functioning well. At this writing, it is more than two years since the patient was treated for the sinus condition.

Fig. 1.—Patient suffering from maxillary sinusitis of left side, with swelling of the cheek.

Diagnosis of maxillary sinusitis by dental roentgenograms is practically impossible. With the knowledge that such disease exists, some pathologic changes can be recognized. In Figure 2, the left side does not show the floor of the antrum clearly. There is a diffuse resorption of the alveolar bone, especially between the first and second molars. Roentgenograms should be made to rule out disease of dental origin. Because of the anatomic structure of the jaws, only large plates should be used in efforts to confirm the diagnosis of antral disease.

Fig. 2.—Upper molar teeth of patient in Figure 1. The outline of the floor of the antrum of affected side is vague.

Such a procedure prevented much embarrassment in one case included in this series:

L. B., a woman, unmarried, aged 30, complained of a severe neuralgic pain of several day's duration on the right side of the face. X-ray examination was negative. A lower bicuspid carrying a porcelain jacket was sensitive to percussion. Pulp tests showed that the pulp was not vital. The root canal was treated and the definite painfulness to the touch disappeared. The pain that radiated to the upper and lower teeth did not diminish. The upper posterior teeth, though vital, became increasingly more painful to

percussion. Several days after completion of the treatment of the lower bicuspid, the patient returned with a swelling of the upper part of the cheek and extending along the side of the nose. Oral examination disclosed a raised area in the buccal region extending to the roots of the second bicuspid and first molar. All of the maxillary teeth were vital to pulp tests. The diagnosis of maxillary sinusitis was made. An anteroposterior plate of the maxillary sinuses showed a diffuse clouding of the right side. (Fig. 3.)

A competent rhinologist confirmed the diagnosis. The infected sinus was irrigated and a considerable amount of pus evacuated. With treatment, the symptoms disappeared within a week. However, a small hard lump

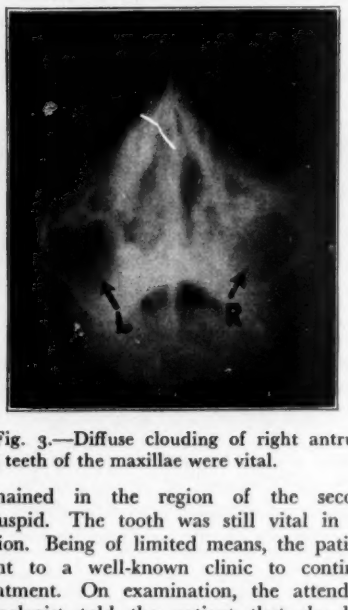

Fig. 3.—Diffuse clouding of right antrum. All teeth of the maxillae were vital.

remained in the region of the second bicuspid. The tooth was still vital in reaction. Being of limited means, the patient went to a well-known clinic to continue treatment. On examination, the attending rhinologist told the patient that she had never had any antral disease and that she was suffering from a "maxillary abscess." He insisted on the removal of the upper posterior teeth on that side. The patient refused treatment. She still has her teeth. The small mass was an attempt of fibrous tissue to encapsulate the area of an infection that had penetrated the thin outer wall of the antrum. The infection disappeared gradually.

It is not essential that the roots of the maxillary molars and bicuspids project into the antrum where disease of the latter causes dental symptoms. In Figure 4 is seen the roentgenogram of Mrs. T. S. She had been suffering from a constant dull pain in the right side of the face. The upper teeth, though sensitive to percussion, were vital. The diagnosis of maxillary sinusitis was confirmed. The antrum was so high in this case that it was not seen in the ordinary dental film.

To further impress the reader with the possibility of adjacent disease causing dental symptoms, this case is cited:

Fig. 4.—Upper teeth in case where maxillary sinusitis caused dental symptoms. Note that the floor of the antrum is not visible.

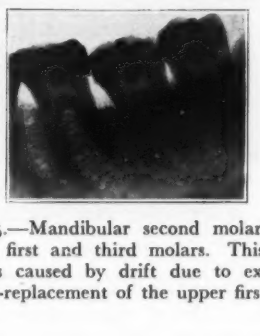

Fig. 5.—Mandibular second molar locked between first and third molars. This condition was caused by drift due to extraction and non-replacement of the upper first molar.

A young women presented herself at the clinic complaining of a severe pain of several days' duration. There was a swelling of the upper lip extending along the side of the nose on the right side. Roentgenographic examination was negative. There was a pericementitis of the upper right central and lateral incisors and cuspid. All responded to pulp tests, in different degrees. The diagnosis of acute alveolar abscess was made because of a barely perceptible depth of color

and tenderness of the lateral incisor. On careful examination, I was impressed with the fact that the swelling extended high above the mucobuccal fold. On examination of the floor of the nose, a large swelling was found. There was an abscess that probably originated about a hair follicle and, with the extension of the inflammatory process, caused definite dental symptoms.

OBSCURED PARTIAL IMPACTION

The average mouth does not present well alined teeth in good occlusion. Crowding of the bicuspids is a common deformity. In many mouths, teeth are extracted and not replaced, drifting of the adjacent and occluding members resulting. With the existence of such conditions in a large percentage of patients, naturally the practitioner is not greatly impressed with such findings unless they are noticeably bad. A small percentage of these cases deveop minor neuralgia resulting from an obscured partial impaction of one or more teeth. The teeth present in the mouths of these patients are erupted. A casual examination does not disclose any deformity. Eight cases are reported in this group, representing barely half of the cases actually observed.

These patients complain of a dull pain in the bicuspid and molar areas. It sometimes radiates to the ear on the same side. The duration varies from weeks to months. Pain is usually constantly present in mild or severe form. Roentgenographic examination discloses no pathologic condition. If there are devitalized teeth present that have no evidence of disease, they are incidental to the clinical picture and should not be disturbed. On examination of the mouth, the tissues are found to be of good color and there is no evidence of disease except for a mild gingivitis that is sometimes present. Careful study of these cases discloses a tooth that is locked between adjoining teeth so as to prevent its complete eruption to the plane of occlusion. In other instances, drifting of some of the teeth has followed the extraction of one or more antagonists in the opposite jaw. Here, there is extrusion of several teeth, fixing the intervening one in a state of partial impaction.

The treatment of these cases usually consists in cutting an approximal surface with a carborundum disk so as to overcome the partial impaction and to permit the tooth to erupt to better occlusion. The surface is then smoothed with abrasive strips or wheels. Subsequent examination of such teeth indicates that they do not decay readily. As a rule, it is not necessary to penetrate the enamel. Relief is instantaneous in most cases. The teeth that are involved may be sensitive to percussion. These conditions may occur with the same frequency in the upper and the lower jaws.

A common site of such malformation is the bicuspid area. Frequently, owing to premature loss of the deciduous first and second molars, there is a tilt of the permanent molar, so decreasing the space that it is not sufficient to accommodate the bicuspids. What usually happens is that the second bicuspid erupts lingually. Where the space is not greatly reduced, the teeth erupt in proper occusal relationship, but are rotated and do not reach fully to the plane of occlusion. A partial impaction may also develop when one or more molars in the upper or lower jaw are extracted. When such teeth are not replaced by bridgework, there is a mesial drift of the last molar present. The antagonist third molar will erupt still farther because of poor occlusion and lock the second molar between it and the first molar. Variations occur with the extent of drift of the teeth involved. The ages of the patients treated in this group varied from 6 to 27 years.

The following case is characteristic:

H. J., aged 16, came to the clinic complaining of pain in the left mandible of a week's duration. Oral examination by the attending dentist revealed no possible cause. The pain seemed to radiate from the bicuspid area. There was slight gingival inflammation

in the region and a mild antiseptic mouthwash was prescribed. The patient returned in a week with the same complaint. It was believed that this condition was caused by the impaction of an apparently erupted first bicuspid between the second bicuspid and the cuspid. The distal surface of the first bicuspid was sliced with a carborundum disk sufficiently to permit the eruption of the tooth to the plane of occlusion. The pain was relieved immediately. A check-up the following week showed no recurrence of pain.

Partial obscured impaction caused by drift of teeth due to the extraction of one or more adjacent teeth is seen in the following case:

M. G., a woman, unmarried, aged 24, complained of a dull pain of two months' duration around the left mandible. At times the pain became very acute and radiated to the upper jaw and the ear. The posterior teeth responded to pulp tests. The gingiva was normal. Careful examination revealed that the lower second molar was caught between the first and third molars. (Fig. 5.) The upper third molar was missing. The upper first molar had been extracted several years previously and this condition had developed during the interval. The upper second molar was in occlusion with the lower second molar at the time of the eruption of the lower third molar. The latter tooth, having no antagonist in the upper jaw, was extruded beyond the plane of occlusion. At the time of eruption of the lower third molar, the upper first molar was extracted. The lower first molar, having no antagonist, was extruded above the plane of occlusion. The upper second molar started to drift mesially and to rotate because the upper first molar was extracted and not replaced. At the time of the onset of the pain, the upper second molar was in occlusion with the distal cusp of the lower first molar. The lower second molar was caught between the distal cusp of the first molar and the mesial cusp of the third molar. Treatment in this case consisted of slicing the distal surface of the first molar and some of the mesial surface of the second molar. There was complete cessation of pain.

Cahn[2] (1931) described a condition that seems to have symptoms typical of obscured partial impaction. He writes:

In the upper jaw the bicuspids are occasionally crowded out of the arch and placed medially. The gum over the roots of these teeth is stretched and compressed. Normally the gum of the palate has a pad of fat beneath the corium. In this fat are a number of nerves. In removing one of these palatally placed bicuspids from a patient with an unaccountable earache, I also cut away the surrounding gum. A section of this tissue disclosed the total disappearance of the fat pad and a marked distortion of the few nerves in the corium.

As indicated in the first case report of this group, the gum is sometimes the supposed source of disturbance. Any gingival inflammation that may exist is indirectly due to the malposition of the teeth. The existence of tension or compression of the alveolar and palatal gingivae is unlikely, as the position and tone of the tissue is the result of slow development rather than abrupt mechanical activity. The interpretation of histologic sections of small pieces of gingiva is often misleading, since sections other than through the central axis distort the relationship of the structures present. These conditions causing localized and reflex pain are the result of partial impaction rather than distortion of the nerves in the gingiva.

There is another type of obscured partial impaction that is probably better visualized as "impaired eruption." A number of cases have been observed, but in only two instances were study models made. The patients were children from 6 to 9 years old, brought in for the relief of toothache. No pathologic condition was present. The dental arches were narrow and the teeth crowded. The pain was due to the impaction of incompletely erupted teeth and the locking and extrusion of a deciduous tooth. The upper second deciduous and first permanent molars seemed to be most affected. The mesial marginal ridge of the erupting permanent molar was caught under the cervix at the distal portion of the decidu-

ous second molar. The erupting force caused extrusion of the latter. Extraction of such deciduous teeth is inadvisable, since there would be a diminution of the space necessary for the permanent bicuspids. These cases usually require orthodontic measures later on. Mild sedatives were prescribed and the pain disappeared spontaneously with the continued eruption of the permanent molar. Extrusion of deciduous teeth beyond the plane of occlusion may have some bearing on the incisal relationship of the anterior teeth and some instances of open bites.

COMMENT

If no apparent cause for existing pain and discomfort can be found on examination, the relationship of the teeth in occlusion and alinement should be considered. Many practitioners may question the effectiveness of the treatment here prescribed and the possibility that these partial impactions can cause such symptoms. Thousands of cases are seen in which there are no complaints of pain. The fact is that we also see in clinical work many patients with infected teeth and gums who appear to be in perfectly good health. In comparatively few are there severe disturbances from foci of infection in the mouth. This does not discredit the fact that such teeth do cause systemic disease. In those cases wherein obscured partial impaction exists, the etiology and treatment are unquestionable, in that the patient is relieved almost immediately and permanently.

I have reason to believe that maxillary sinusitis involving dental pain is not uncommon. Patients suffering from sinus disease will often attribute pain to supposedly defective teeth. When the patient's complaint is not justified by evidence of disease as adduced by clinical and roentgenographic diagnosis, it is suggested that the possibility of the existence of maxillary sinusitis be considered.

CONCLUSIONS

Disease of the maxillary sinuses is capable of causing symptoms pathognomonic of minor neuralgia and localized dental disturbances. These cases are characterized by sensitiveness of the upper posterior teeth to percussion, pain of varying intensity, but generally confined to the affected maxilla and, rarely, swelling of the cheek. Dental intervention is usually unnecessary. All symptoms disappear with treatment of the sinus through the nasal route.

Obscured partial impaction involving one or more teeth can cause pain in the upper or lower jaw. There is no evidence of any disease in routine clinical and roentgenographic examinations. These conditions are relieved immediately by the operative methods described.

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331 Lexington Avenue.

NEW TECHNICAL ADAPTATIONS IN THE PRACTICE OF DENTISTRY FOR CHILDREN

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THROUGH the years, the dental profession has been preaching and teaching care of children as a preventive measure against dental disease. The mass inertia of the people and lack of interest in a disease so common as dental caries have resulted in a tremendous amount of sickness and disease throughout the world. Gradually, a change in attitude is coming about, for many reasons. Probably one of the most potent influences at this time is the increasing interest of state and federal governments in the general health of the people. There is not sufficient time to present a detailed account of the many activities of government agencies in focusing attention on the problem of maternal and child welfare.

I do want to call attention to the "refresher courses" in public health and dentistry for children being given in various states through allocations from federal and state funds. Last November, Floyd de Camp, of the Oregon State Board of Health, and I were invited to Arizona to give to six groups an intensive course on various phases of preventive and operative dentistry for children. We were impressed with the enthusiasm and eagerness of our audiences regarding dentistry for children. This is only an example of the trend in dental thought and practice at this time. The mass of the population is gradually becoming interested in the possibilities of dental service, and therefore it becomes necessary to train dentists to deliver their services in a more efficient way.

The dental colleges, in response to the need, are giving special attention to undergraduate instruction in pedodontia. Some are pioneering in graduate work, looking toward preparing dentists for public health and administrative positions being created by this new emphasis on child dental care.

The main attack, however, must be made by the dentist in private practice. Therefore, I shall present a few ideas which may be helpful.

GROWTH AND DEVELOPMENT

This is a subject upon which many books could be written. Rather than go into a tiresome dissertation on the subject, I shall report several cases.

Case 1. The patient came to me as a little girl and I have watched her grow and develop. At the proper time, three of her second deciduous molars erupted, but the fourth failed to appear. I have roentgenographed that area at regular intervals. The pictures (Fig. 1 and Fig. 2) show that the

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second deciduous molar never erupted, but stayed in its original position. The interesting thing is that the films show the developing bud of the bicuspid forming in a lingual position, and gradually developing until it is above the buried second deciduous molar. Many authorities were consulted and the consensus of opinion was that it should be let alone until such a time as the tooth could be removed with a minimum of danger to the surrounding structures.

Case 2. A boy, aged 5, had a number of congenitally missing anterior deciduous teeth, among them the upper and lower central and lateral incisors. The upper first deciduous molars were also missing. There were also no permanent central or lateral incisors, although the permanent teeth in the lateral division seemed to be developing. In this case, fixed anterior bridges were constructed with a separation at the median line for growth. (Fig. 3.)

Technic of Construction.—With copper bands, individual impressions were taken of the cuspid teeth to which the anterior bridge was to be fixed. The cuspids were so shaped in this case that no trimming was necessary except running a disk through the contacts of the lower cuspids and first deciduous molars. Cast gold crowns were made with the incisal edges open. The crowns were placed on the teeth and a compound impression was taken. After the stone model had been prepared with the crowns in place, Steele facings were selected and adjusted to place on the cast. A plaster core was made and the backings were waved and cut at the middle point. Two 0.030 gold tubes were cut about the same length and width of the central incisor facing. Carbon points were fitted into the tubes and they in turn were buried in the wax on one side of the median line. Care should be exercised in paralleling the tubes so that the round wires when inserted will not point anteriorly into the porcelain facing area. The next step was to cast the side in which the round tubes were waxed. After polishing, the casting was placed in the plaster core. The round wires were inserted and the other half of the bridge was waxed for casting. Both parts, when finished, were luted in place and each

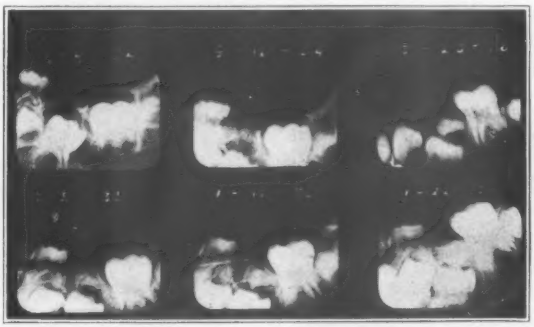

Fig. 1.—Unerupted second deciduous molar. Calcification of the second bicuspid is shown, beginning with the tooth bud.

Fig. 2.—Second bicuspid passing unerupted second deciduous molar in development.

half was soldered to its respective cuspid crown.

After the bridge had been worn one year, the increase in size of the arches opened the space at the midline about 3 mm. and necessitated a rebuilding of the bridge, using wider central incisors. (Fig. 4.)

CARE OF DECIDUOUS TEETH

(a) Copper amalgam is clinically one of the best materials, if not the best material to use in deciduous teeth. The silver amalgam "addict" will immediately think of all the disadvantages of copper amalgam, which I am willing to grant. However, copper amalgam has therapeutic advantages which silver does not have,

Fig. 3.—Fixed anterior bridge with broken stress arrangement to allow for growth in child aged 5.

and the deciduous pulp will tolerate it in close proximity better than it will silver. As the deciduous tooth surface wears down, the copper amalgam wears or cups and keeps pace with the natural wear. Silver does not wear down, but stands up and presently is cracked out in two or more pieces. Many times, the pulp dies under these cracked and leaky silver amalgam fillings. A type of copper amalgam should be selected which is not too slow in setting, and the child must be warned against eating too soon after the filling has been placed. Again I say that, clinically, the use of copper amalgam has better results in deciduous teeth, over a long period of time, than employment of silver amalgam.

(b) Silver alloy inlays cast of 75 per cent silver, 10 per cent palladium and 12 per cent copper, with the remainder zinc, tin, etc., are a very fine means of restoring certain broken down deciduous teeth when a plastic filling might not have sufficient retention. I have found this alloy very good for constructing the crowns and bands in certain types of space maintainers. It can be soldered

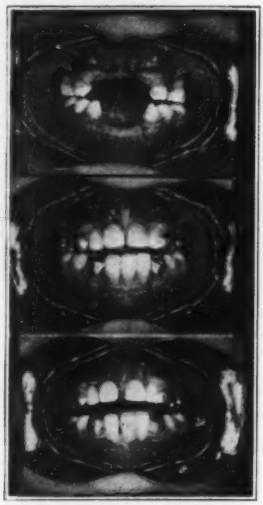

Fig. 4.—Case of boy aged 5 with congenitally missing anterior teeth; mouth before and after bridge was inserted. The lower view taken one year later shows growth separation between the central incisors.

to and cast as inlays with the same technic as that used in gold alloys.

(c) Chrome alloy band materials and wires are proving to be very good in the construction of space maintainers. (Fig. 5.)

Technic of Constructing a Space Maintainer.—When a lower second deciduous molar has been extracted, a copper band, trimmed to fit the first

permanent molar, is mounted on a tongue depressor with compound. Melted compound is dropped into the band until it is full. The mass, cooled to mouth temperature, is placed over the tooth, and the child is instructed to bite it down to place. This procedure will usually be tolerated better than if the dentist pushes the band down. The band is then removed and chilled, and either an amagam die or a copper deposited die is made. I favor a copper deposited die because of its hardness and negligible cost. A chrome alloy band is constructed on the die by electric spot welding at the joint. Since this material can be stretched one-eighth of its length without cracking, the band can be made to fit very tight. Now the band is placed on the tooth in the mouth and a compound impression taken of the side being operated upon. After the model is run in a hard stone, a 0.025 or 0.030 chrome alloy wire is bent in the form of a loop. After adjusting, the molar band is removed from the stone model and both ends of the looped wire is spot-welded to it; one end on the buccal and the other end on the lingual surface. This makes a very efficient and inexpensive space maintainer.

Fig. 5.—Chrome alloy welded loop retainer.

(d) Thin stainless steel, or chrome alloy, fitted to a tooth and spot-welded, with one or two spots, makes an ideal matrix for deciduous teeth. Owing to its stretching ability, chrome alloy is the one material with which a tight fitting matrix can be made for a deciduous tooth.

DENTAL PROCEDURES FOR ADOLESCENTS

Too much emphasis cannot be placed on the use of bitewing roentgenograms as a routine procedure. During the preschool and transitional periods of development, many unsuspected interproximal cavities in the deciduous teeth will be revealed.

As the child grows older, the adolescent years bring added stress and strain to the developing dental organs, and we find many beginning spots of caries on the interproximal surfaces of the bicuspids and molars. In other papers, I have discussed my theory as to their etiology.[1]

In a desperate effort to find something to prevent decay, there has been a renaissance of the use of ammoniacal silver nitrate, commonly known as Howe's solution. Prime[2] has repeatedly presented evidence of the preventive effects of the use of this solution. In selected cases, more of us should convince ourselves of its efficiency.

The tragedy of preventing caries up to the adolescent years and then having the work destroyed in the space of a few months should stimulate more men to study ways and means of preventing interproximal as well as other forms of caries.

HYPOPLASTIC MOLARS AND MISSING TEETH

It is not at all rare to see cases wherein there are missing bicuspids under second deciduous molars. (Fig. 6.) Many times, the occlusal line changes with growth, and the surface of the deciduous molar is left below this new line of occlusion. The roots of the deciduous teeth frequently are short and do not afford much support. Again, because of the growth pressure from behind, the first permanent molar is forced back against the distal surface of the deciduous molar and, in some cases, almost below the gums. What is the best thing to do?

To extract the deciduous molar and move the first permanent molar forward with orthodontic appliances to fill the

space of the missing tooth would probably be the ideal operation.

In Figure 7, a compromise is presented. The second bicuspids on both sides of the mandibular arch were absent in this mouth. The first permanent molars had moved forward and lowered the occlusal line by depressing the deciduous molars. As a further complication, the first permanent molars were hypoplastic and the occlusal surfaces imperfect in formation. The technic of restoration consisted in making large molar overlay castings to correct the occlusal height, and the second deciduous molars were extracted. Then pontics were built to the correct bicuspid mesiodistal diameter and soldered to the overlays. Owing to the extra width of the second deciduous molars, there was a space of several millimeters between the pontic and the first bicuspid when the appliances were cemented to place. It was surprising to see, in a few months, that the space was closed by the forward movement of the posterior teeth.

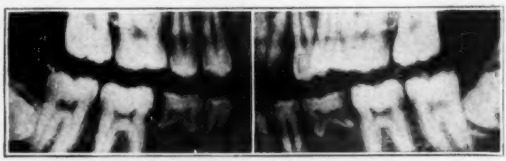

Fig. 6.—Missing second bicuspids under retained lower second deciduous molar.

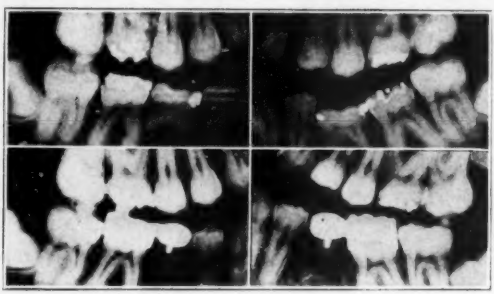

Fig. 7.—Compromise treatment in which pontics are soldered to inlays placed on hypoplastic first permanent molars where second bicuspids are missing. Pressure has carried the pontic up against the first bicuspid.

A NEW PLATINUM-PORCELAIN PIN INLAY, BROKEN INCISAL EDGE RESTORATIVE TECHNIC

For a number of years, I have been trying to work out a system of caring for broken incisors in children. In other papers, I have outlined the complete technic in these cases.[3, 4, 5, 6] One phase I have been trying to improve upon is the baking of porcelain corners, of correct shade, directly on a cast platinum backing.

This is now possible, owing to the efforts of Carl Johnson, who has worked out a special investment in which platinum and iridioplatinum can be cast in any shape. Because we have not been able to cast platinum accurately before, and because this method permits handling these broken incisors in a better way, I have asked Dr. Johnson's permission to present his casting technic.

Perhaps you will recall that I have classified fractured and injured incisor teeth as follows:

First Degree Fracture.—The incisal tip

is broken, but only a slight amount of enamel and dentin has been removed.

Second Degree Fracture.—The incisal tip is broken and there is only a thin layer of dentin overlying the pulp, with near-exposure.

Third Degree Fracture.—A large amount of enamel and dentin is lost, and the pulp horns are exposed by the fracture.

The most difficult restorations are the class 2 type, where platinum pins must be used for major retention.

Technic of Restoration.—The corner is prepared with flat seats on the mesial or distal surface, and on the incisal surface when possible. Some enamel must be removed on the lingual surface and a slight amount on the labial surface

Fig. 8.—Fractured central incisor with distal corner to be restored.

to give resistance and retention. A small hole is drilled and a platinum pin (0.025) is placed lingually of the mesial or the distal margin, as the case may be. A copper band is fitted to the tooth and a compound impression is taken of the cavity preparation, with the iridioplatinum pin in place. A very thin coating of wax is placed on the platinum pin after the impression has been chilled and removed. Then a silver amalgam or copper deposited die is made with a root sufficiently long to be grasped. The compound is softened in hot water and the copper band removed, the pin being left exposed in the amalgam die. The pin is loosened gently until it moves freely in and out of the hole.

From this point, the technic differs from the previous technics that I have described. The die is oiled and a wax inlay is made, attached to the pin or pins. The labial portion is cut out in the exact amount that the porcelain is supposed to duplicate tooth structure, the operator making sure that there is a box retention. (Fig. 6.) Then a wax, not a metal, sprue is attached on the lingual side.

Let us now digress to better understand the investing preparatory to casting in platinum. I shall quote from the directions given for Johnson's platinum investment:

> Although the individual steps in the technic for the casting of platinum are in themselves simple, they must be carried out precisely. The extreme temperatures involved and the ease with which platinum is contaminated in its molten state permit no omission of detail. . . . While the expansion coefficient of platinum is much smaller than that of gold, the wide range of temperature through which it cools, together with other factors involved in its casting, produces a gross shrinkage which is much greater than that encountered in gold castings. Compensation for this shrinkage is obtained by creating an oversized model of the master die or cast and by fashioning the wax pattern over this enlarged model, thus producing a proportionately oversized pattern.
>
> The investment consists of three separate materials:
>
> (a) Crucible stock from which the crucible portion of the mold is made (Fig. 9).
>
> (b) Inner investment in the form of a ready mixed paint with which the pattern is covered.
>
> (c) Outer investment which surrounds the paint and completes the mold.
>
> Crucibles should be made up in advance and kept on hand for use. This is done as follows: A quantity of the crucible stock is mixed with water into a mass which will mold in the hand like putty. This mass is then rolled into balls about one inch in diameter. Each of these balls of material is vibrated and moulded over a clean, oiled metal crucible-former resting on the stage of

the mechanical vibrator, until it forms a cap over the metal. This cap should be somewhat of the shape of an inverted flat bottomed bowl with a wall thickness of about ¼ inch. With the adapted crucible material resting in the cup of the hand for a support, the metal crucible former is removed with a twisting motion leaving the molded crucible. These molded crucibles are pierced for a sprue hole, allowed to dry, fired to red heat in the oven (or with blow torch) and when cool are ready to be stored for immediate use.

Take a prepared crucible and carefully pass the wax sprue, attached to the wax backing, through the hole in the crucible and lute it so that the pattern is just above the mold (Fig. 9). All wax surfaces, including sprues, are covered with the *inner paint* by flowing it on with a small brush. More than one coat may be necessary until a thickness of 1/32 inch is attained.

After the paint is thoroughly dry (15 to 30 minutes) the outer investment is mixed with water to a medium stiff consistency that can be easily vibrated. The crucible and the painted pattern are quickly immersed (not soaked) in water and the outer investment vibrated over the pattern. After the mass is thoroughly set, burning out must be commenced in a cold oven and the temperature advanced slowly till the wax has melted out and the mold is practically dry throughout. This stage of heating should consume at least 30 minutes and the temperature should not exceed the boiling point of water. From this point on the temperature may be advanced safely at any reasonable rate to red heat (about 1100 to 1300 F.) at which temperature the casting can be made.

In using the pressure type casting machine, 20 to 30 lbs. pressure should be used. The metal is heated to the fluid state, preferably with the oxy-hydrogen blowpipe.

Fig. 9.—Crucible form with wax pattern attached and covered with special paint mixture; cast platinum pin inlay on die.

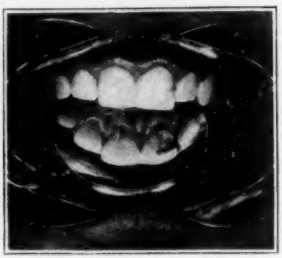

Fig. 10.—Finished case with cast platinum porcelain-covered pin inlay.

(Oxygen-gas will do it.) When the metal has been brought to the proper state of fluidity, the making of the casting and the withdrawal of the flame must be simultaneous because the radiation factor is so great that a minute fraction of a second makes the difference between success and failure.

The finished casting is cleaned off and soaked in hydrofluoric acid until clean.

The casting is corrected in the mouth and polished. Then a platinum matrix is swaged over the die, the pins are forced through and the backing is pushed tightly to place on the die. Porcelain is then baked in the platinum backing. Opacity will be necessary to blot out the platinum's bluish tinge. After the porcelain is finished, the platinum matrix is stripped off and the platinum-porcelain pin inlay is cemented to place. (Fig. 10.)

This is a new process and will no doubt open up many new possibilities and adaptations in restorative dentistry.

Several ideas and technics have been

presented here in an effort to stimulate the dentist to undertake research in and to study particularly dentistry for children.

Newsweek, under date of February 6, said:

Note that a "Children's Era" is beginning to open up in Washington. . . . Now the various agencies concerned with child welfare are becoming aggressive. The Social Security Board's recommendation for more aid to dependent youngsters will be followed by other drives for child aid through the health program and similar means. A preliminary conference staged by the Labor Department's Children's Bureau this spring will help the movement.

The tide and trends are flowing fast toward preventive care for children.

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VALUE OF POTASSIUM IN LOCAL ANESTHETIC SOLUTIONS OF PROCAINE WITH EPINEPHRINE

By M. L. Tainter, M.D., and A. H. Throndson, D.D.S., San Francisco, Calif.

IT has been known for many years[1] that potassium salts have a local anesthetic potency nearly as strong as that of procaine, when tested under experimental conditions. These salts can paralyze motor and sensory nerves, if the solutions are applied directly to the isolated structures, and can reduce the amount of procaine needed to block the nerves and prolong the anesthesia. Some of these effects are obtained on injection and, to a lesser extent, in topical application to the conjunctiva and cornea of rabbits. The greatest effects are produced when the nerve, isolated from surrounding tissues, is bathed in the solution in question. Under these conditions, potassium chloride completely blocks sensory nerves in concentrations of 0.5 per cent and even less. However, when the solutions are injected, the potency is not so great, possibly because the potassium diffuses easily through the tissues, and the local concentration is not well maintained.

It has been stated that potassium reduces the total toxicity of local anesthetic mixtures, presumably by reducing the total amount required to produce a given degree of anesthesia. Under some, but not all, conditions, this reduction of toxicity is sufficiently great to indicate a true synergism; that is, an effect from the solution greater than would be expected from the additive actions of its components.

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The clearest evidence of synergism has been brought forward by Kochmann and his students[2-6]; whereas Sollmann's experiments[7-8] showed that synergism held for motor nerves, but not for sensory.

Because of these results, obtained chiefly on lower animals, there is being sold to the dental profession a great number of local anesthetic solutions which are made isotonic with potassium salts instead of the usual sodium chloride. For example, in a recent list of the formulas of seventy-three procaine anesthetic solutions now on the market, thirty-two, or almost one-half, contained potassium, the intention presumably being to make use of this synergistic or additive local anesthetic effect. Although the evidence for this phenomenon is acceptable for the responses of animals and isolated tissues, it is not nearly so conclusive for the clinical results, since the latter studies have lacked completeness or persuasiveness.

For instance, reports by Hoffmann and Kochmann,[2] Sollmann[9] and Silverman[10] have stated that potassium actually is effective in human injections. However, Smith[11] failed to show any advantage of potassium buffered solutions over those containing sodium chloride. Because the differences, if any, are apparently rather slight, the ordinary clinical method of injecting the solutions and recording what happens, without making parallel series of control observations, is not adequate. Such a procedure allows too much opportunity for subjective impressions to affect the validity of the observed responses.

No one, as far as we know, has attempted an adequately controlled study of the value of potassium solutions in order to determine whether, under conditions of actual clinical usage, they have a greater potency than the simpler solutions made up with ordinary sodium chloride.

The literature bearing on this problem has been summarized by one of us recently[1] in the chapter on local anesthesia in "Dental Science and Dental Art," to which the reader is referred for a more complete discussion. In view of all this, it was thought desirable to investigate the clinical potency of local anesthetic solutions containing potassium in comparison with similar solutions containing sodium chloride.

TABLE 1.—AMOUNT AND DISTRIBUTION OF PERTINENT DATA IN CLINICAL COMPARISON OF POTASSIUM-CONTAINING LOCAL ANESTHETIC SOLUTIONS WITH THOSE CONTAINING SODIUM CHLORIDE, BOTH IN ISOTONIC CONCENTRATIONS*

Solution	Total Number of Patients	Total Number of Injections	Average Injections per Patient	Type of Injection Number and Percentage of Total Cases		
				Mandibular	Tuberosity	Infra-Orbital
Potassium sulfate	130	194	1.50	82 42.3%	48 24.7%	64 33.0%
Sodium chloride	308	484	1.57	203 41.9%	134 27.7%	147 30.4%
Totals	438	678	1.55	285 42.0%	182 26.9%	211 31.1%

*Both solutions contained 2 per cent procaine hydrochloride with 1:50,000 epinephrine as the vasoconstrictor.

METHODS

The methods used in this investigation were substantially the same as those described in previous papers on local anesthesia from this institution and reported

in THE JOURNAL.[12-14] The local anesthetic solutions used by the oral surgery clinic staff were made up by one of us and supplied as needed in containers identified only by numbers. A trained observer made continuous observations of the effects of the various solutions, recording the data on a suitable mimeographed form. This observer did not know the composition of the solutions being used, and the identifying numbers were changed along with the anesthetics themselves at frequent intervals, so as to eliminate all subjective impressions. In this way, purely objective judgments were secured as to the results of each injection.

Procaine hydrochloride in 2 per cent strength with epinephrine hydrochloride 1:50,000 was the basic constituent of each solution. This mixture was made isotonic by adding either 0.48 per cent sodium chloride or 0.95 per cent potassium sulfate. Measurements of the osmotic pressure of the two solutions by freezing point determinations showed that they were isotonic with blood.

At the end of the study, the records were segregated, the results tabulated and the averages computed. The probabilities of significant differences between the averages were determined in the manner described in previous publications.[12-14] The object of the calculations was to determine whether any differences in the averages of the two solutions were great enough to have resulted from true differences between them, or rather were the result of chance variations introduced by the personal variations from patient to patient. These calculations consisted of computing the standard errors of the averages, which, in general terms, indicate within what limits the averages could be expected to fluctuate.

When the degree of variability of each average is known, the significance of any differences that were observed between the two solutions can be interpreted in the

TABLE 2.—COMPARISON OF AVERAGE EFFECTS OF ANESTHETIC SOLUTIONS MADE ISOTONIC WITH 0.98 PER CENT POTASSIUM SULFATE INSTEAD OF 0.45 PER CENT SODIUM CHLORIDE*

Solution	Volume Required Cc.	Time Onset Anesthesia Minutes	Duration Anesthesia Hours	Pulse Rate Changes Beats per Minute	Blood Pressure Changes in Mm. Hg.		Respiratory Rate Changes per Minute
					Systolic	Diastolic	
Potassium sulfate	5.06	2.88	2.91	+8.42	+3.27	−3.01	+0.87
Standard error of average	±0.272	±0.136	±0.229	±0.992	±0.966	±0.673	±0.284
Sodium chloride	5.33	2.91	2.69	+6.52	+2.88	−3.38	+1.23
Standard error of average	±0.155	±0.084	±0.087	±0.681	±0.752	±0.595	±0.255
Probability of a true difference between the solutions	40%	62%	37%	11.4%	75%	68%	35%

*Each solution contained 2 per cent procaine hydrochloride with 1:50,000 epinephrine as a vasoconstrictor. The smaller the probability percentage value, the less the chance that such a difference could have resulted from chance variation and the greater the probability that the difference is a true one. For example, with a 50 per cent probability, the odds that the difference arose by chance are 50:50, or equal; with a 5 per cent probability, they are 5:95, or only 1 in 19; etc.

TABLE 3.—COMPARISON OF FREQUENCY OF IMMEDIATE EFFECTS, EXPRESSED AS PERCENTAGES OF TOTAL CASES, WHEN POTASSIUM SULFATE WAS USED IN PLACE OF SODIUM CHLORIDE IN LOCAL ANESTHETIC SOLUTIONS*

Solution	Frequency of Incomplete Anesthesia	Frequency of Painful Injections	Amount of Bleeding			Side Actions				Frequency of Completely Satisfactory Anesthesia
			Slight (Trace up to 2 Drops)	Moderate (2 Drops to 0.2 Cc.)	Excessive (Over 0.2 Cc.)	Perspiration	Nervousness	Tremor	Fainting	
Potassium sulfate	17.4	25.9	8.3	71.2	20.5	15.4	36.2	13.1	7.7	85.7
Standard error of percentage	±3.28	±3.77	±2.40	±3.94	±3.59	±3.17	±4.22	±2.96	±2.34	±3.99
Sodium chloride	18.9	17.2	16.3	57.6	26.1	13.5	35.0	15.8	7.1	91.0
Standard error of percentage	±2.13	±2.13	±2.11	±2.82	±2.51	±1.94	±2.70	±2.05	±1.46	±1.76
Probability of a true difference between the solutions	70%	3.6%	1.8%			60%	81%	47%	83%	18%

*Each solution contained 2 per cent procaine hydrochloride with 1:50,000 epinephrine, made isotonic by the addition of either 0.98 per cent potassium sulfate or 0.45 per cent sodium chloride.

light of the amount of variation to be expected. In order to get a numerical expression for its significance, this difference is expressed in terms of percentage probability. These probabilities are the percentage chances that a variation between the two averages of the magnitude observed could have occurred from chance variations in the individuals studied, rather than from inherent differences in the solutions. The smaller the percentage probability value, the slighter the chance that such a difference could have occurred as the result of variations in the patients, and therefore the greater the probability that the difference is the result of a true difference between the solutions.

For ordinary purposes, it is considered that a probability below 5 per cent, that is, one chance in twenty, is necessary as a basis for drawing safe conclusions. Therefore, in this study, we have not emphasized differences which did not have a probability of this size or lower. For the data involving measurements of the responses, formulae applicable to continuously variable data were employed; whereas, in those observations involving the frequency of a given event, formulae for the calculations of significance of attributes were used. As calculations on the amount of bleeding do not lend themselves readily to this type of treatment of the data, the probability for this was estimated by the chi square method, as set forth by Fisher.[15]

Data were already available from a series of 244 patients receiving injections of the same procaine-sodium chloride solution and who were the control groups in previous studies on local anesthesia published from this institution.[12-14] Sixty-four additional patients were given this solution in the present observations to determine whether there had been any changes in technic that had modified the responses. The data on these two identical solutions were compared by making the calculations referred to above on each series separately, and then determining whether there were any differences between them of probable validity. However, it was found that there were no

TABLE 4.—COMPARISON OF FREQUENCY OF LATE EFFECTS FROM LOCAL ANESTHETIC SOLUTIONS MADE ISOTONIC WITH POTASSIUM SULFATE INSTEAD OF SODIUM CHLORIDE, EXPRESSED AS PERCENTAGES OF TOTAL NUMBER OF CASES*

Solution	Late Pain at Site of Injection	Swelling at Site of Injection	Trismus	Septic Alveolus (Dry Socket)	Inflammation at Site of Operation
Potassium sulfate	27.8	17.7	25.3	8.9	50.6
Standard error of percentage	±5.04	±4.31	±4.89	±3.37	±5.63
Sodium chloride	28.7	21.2	25.3	8.4	64.6
Standard error of percentage	±2.94	±2.65	±2.82	±1.80	±3.11
Probability of a true difference between the solutions	88%	40%	100%	89%	2.7%

*Both solutions contained 2 per cent procaine hydrochloride with 1:50,000 epinephrine as the vasoconstrictor, and either 0.98 per cent potassium sulfate or 0.45 per cent sodium chloride.

significant differences. Thus, we were enabled to use the earlier data to supplement those of the present study by simply combining the two series. This gave a total of 308 patients receiving the procaine-sodium chloride solutions. For comparison with these results, 130 patients received injections of the potassium sulfate-procaine hydrochloride solution. Thus, there were 438 patients for the entire study (Table 1), receiving a total of 678 injections, or an average of about 1.5 per patient in each series.

In order to determine whether the various types of injections were made with equal frequency with each solution, the observations were classified on this basis. Table 1 shows that the proportions of the various types of injections were similar in the two series. It follows that the clinical material was enough alike in the two series that the average effects may be compared with a high degree of certainty as to the validity of any differences observed.

IMMEDIATE EFFECTS

The immediate effects of the two solutions are summarized in Table 2. It might be expected that if potassium adds to the potency of the local anesthetic, less solution will be required than if it were not present. However, almost exactly the same quantity was required, the average volume used being 5.06 cc. of potassium sulfate solutions, as compared to 5.33 cc. for the sodium chloride solutions. It might also be expected that potassium would hasten the onset of anesthesia, but the actual observations revealed no such difference. Neither was there any appreciable prolongation of the duration of anesthesia, since this was 2.91 and 2.69 hours, respectively. None of these differences was great enough, when tested by the probability calculations, to indicate a true difference between the two solutions.

The pulse rates tended to be increased slightly more by potassium sulfate than by sodium chloride, the difference being only about two beats per minute on the average. This difference is so small that only an 11 per cent probability of significance was secured, a value which indicates a one to nine chance that it was the result of random variation. Whether the difference was a real one or not, its magnitude is too small to be of clinical importance.

The blood pressure responses were analyzed from the standpoint of systolic and diastolic changes during the progress of the anesthesia. The average changes in these were also identical with the two solutions, there being only a difference of a fraction of a millimeter, which was too small to have any significance. Similarly, the average effects on respiration differed by only 0.36 respirations per minute, a value entirely too small to mean anything.

It must be remembered that the absolute change in these functions in each individual was usually greater than the averages, inasmuch as the blood pressures and respiration in individual patients were either increased or decreased, and thereby partially balanced in the averages. However, tabulation of the individual changes showed that extreme degrees of either increase or decrease were no more frequent in one series than in the other, so that the averages truly represent the lack of differences between the solutions.

Anesthesia was incomplete in 17.4 per cent of the potassium injections as compared to 18.9 per cent of the injections of sodium chloride (Table 3). This difference is entirely too small to be of any clinical significance. The potassium sulfate solutions caused pain on injection in 25.9 per cent of the patients, but in only 17.2 per cent of those receiving sodium chloride solutions. This difference of 8.7 per cent has only about one chance out of thirty of being a chance fluctuation. Therefore, it would appear that potassium

sulfate-procaine solutions were painful and irritating to the tissues at the moment of injection more frequently than were sodium chloride-procaine solutions. However, as the pain was not sufficiently great to deter use of the solution, this fact, although against the desirability of the potassium sulfate, is not important in practice.

As the types of operations performed with the two solutions were very similar (Table 1), the frequency of various amounts of bleeding afforded a satisfactory estimate of the vasoconstriction present in the tissues. Only a slight amount of bleeding occurred in 8 per cent of the patients receiving the potassium sulfate solution (Table 3); whereas the same degree of bleeding occurred in twice that number, or 16 per cent, of those given the sodium chloride solution. Excessive bleeding occurred in 20 per cent of those receiving the potassium sulfate solution, and in 26 per cent of those receiving the sodium chloride solution. However, 71 per cent of the patients receiving potassium had moderate degrees of bleeding, as compared to 58 per cent of those receiving the sodium chloride solution. These differences are great enough to permit a strong presumption that they were not the result of chance variation. However, they do not indicate a clear superiority of one solution over the other, inasmuch as the greater frequency of excessive bleeding in patients receiving sodium chloride was offset by the also greater frequency of those in whom the bleeding was minimal from the same solution. Hemorrhage of sufficient magnitude to cause clinical difficulty in the management of the patients was not experienced in these series. Although the differences may indicate a true differentiating factor between the two solutions, they are not of such magnitude as to be an important element in the choice of an anesthetic.

The frequency of reactions suffered by the patient while in the chair was analyzed in the same manner as other effects. Table 3 shows that perspiration occurred in 15 per cent of the patients receiving the potassium sulfate and 13 per cent of those given sodium chloride. Nervousness was seen in 36 per cent and 35 per cent of the patients, respectively. Tremors were present in 13 per cent and 15 per cent, and fainting in 7 per cent with both solutions. The frequencies of these reactions are so similar that in no instance did one solution show any clear advantage over the other. At the conclusion of the operation, the anesthetist recorded his impression as to whether the anesthesia had been completely satisfactory. This was the case in 85.7 per cent of the patients receiving potassium sulfate solutions and in 91 per cent of those receiving sodium chloride solutions. This small difference favors the sodium chloride, and may have some significance.

LATE EFFECTS

Finally, the conditions of the patients after the operation were compared. Irritation from the solution was indicated by pain and swelling at the site of the injection. The injection sites were painful in about 28 per cent after either solution and swollen in 17.7 per cent with the potassium sulfate as compared with 21.2 per cent with the sodium chloride, a difference too small to be of significance. Another indication of harmful irritation was trismus or spasm of the muscles resulting from continued local irritation. This occurred in 25.3 per cent of both series, again indicating no difference between the two salts. Septic alveoli, or dry sockets, were said to be present whenever there was enough infection or local aftereffect in the sockets for the patient to return repeatedly for postoperative care. This did not mean that each patient had a clinically diagnosable osteomyelitis of

the alveolus, although, in a few instances, this was the case; but rather that the healing had been delayed more than would normally be expected. The potassium sulfate solution caused an incidence of 8.9 per cent of this condition as compared to 8.4 per cent after sodium chloride solution, a negligible difference.

Finally, comparisons were made of the amount of inflammation or reaction around the operative site. This is an unreliable index to the effects of an anesthetic solution, since it is governed largely by the amount of operative trauma, infection and other factors unrelated to the local anesthetic itself. However, the records showed that there were 50 per cent of postoperative inflammatory reactions at the site of the operation when potassium sulfate was used, and 64 per cent when sodium chloride was used. This is a difference against the sodium chloride of 15 per cent, or one patient out of seven, which probably did not result from chance variations.

SUMMARY AND CONCLUSIONS

1. The comparative local anesthetic effects of 2 per cent procaine hydrochloride with epinephrine (1:50,000) made isotonic with either 0.95 per cent potassium sulfate or 0.48 per cent sodium chloride were determined in 438 patients according to the "blind-test" technic, to determine the validity of experimental claims that potassium salts have useful local anesthetic actions. The average responses from the two solutions and the probability of their being significantly different were computed according to standard statistical methods.

2. The addition of potassium sulfate did not increase the local anesthetic potency of the procaine-epinephrine solution, since the volumes required and the time of onset and duration of anesthesia were the same as with sodium chloride-containing solutions, and incomplete anesthesia was about as frequent with one solution as with the other.

3. Pulse, blood pressure and respiration were affected in similar degrees with the two solutions.

4. However, in 25.9 per cent of the patients, injection of the local anesthetic was painful with solutions containing potassium sulfate, as compared to 17.2 per cent with the sodium chloride. This difference is too great to be the result of chance variation.

5. The amount of blood lost in the various operations tended to be moderate with potassium sulfate solutions, whereas, with sodium chloride, cases of both slight and excessive bleeding were more frequent, but the differences were not important.

6. The side actions of perspiration, nervousness, tremor and fainting occurred with equal frequency in the two series. However, the potassium sulfate solutions were completely satisfactory to the operators in only 85.7 per cent of the cases, whereas this was increased to 91 per cent when sodium chloride was used.

7. The after-effects of the operations, such as pain, swelling and trismus, observed on subsequent days, were the same in the two series. Septic alveoli, or dry sockets, which were sufficiently marked to require extra postoperative care also occurred with equal frequency. The areas operated upon were inflamed in about one-half the patients receiving potassium sulfate, as compared to 64 per cent of those receiving the sodium chloride solution. This difference is great enough not to be the result of chance variations in the patients. However, since the latter changes are commonly governed by operative conditions, type of operation, degree of trauma and infection, conditions in no way related to the anesthetic agent itself, the significance of this observation is uncertain.

8. Therefore, these results, taken as a

whole, show that when solutions of procaine with epinephrine made isotonic with potassium sulfate are compared with those to which sodium chloride is added, in a series of "blind-test" observations in which personal bias and subjective factors are rigidly excluded, no clinically significant differences great enough to be established with certainty are demonstrable even in as large a series as 678 injections.

9. Since potassium sulfate does not add to the clinical effectiveness or desirability of solutions of procaine for local anesthesia, there is no sound reason for complicating anesthetic solutions by using this salt in them. Isotonicity can be secured as readily with sodium chloride, a salt normally in the body fluids in concentrations similar to those required in local anesthetic solutions.

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FEDERAL LAWS ON FOODS, DRUGS, DEVICES AND COSMETICS

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JANUARY 1, the labeling provision of the new Food, Drug and Cosmetic Act became effective. In accordance with federal law, a qualitative statement of composition must now appear on the package labels of all drugs sold in interstate commerce. Thus, a partial answer to the fundamentally important question "What does it contain?" is now required by law. The pernicious practice of selling secret remedies has been condemned officially.

While the altered appearance of most package labels of dental medicinals will attract the dentist's eye, it should be noted that this represents only a part of the new program relating to legal control over foods, drugs and cosmetics.

The 1938 session of Congress was a noteworthy one from the viewpoint of those persons and organizations interested in protecting the public from fraudulent and unfair methods of selling foods, drugs, devices and cosmetics. Both a new food and drug act and important amendments to the Federal Trade Commission Act were passed at this session. These changes were enthusiastically received by many persons interested in consumer protection, in spite of the fact that they did not cover a number of provisions which were believed to be necessary for maximum improvement over the preexisting laws.

Bills introduced in the 1939 sessions of a number of the state legislatures indicate that similar legislation is being proposed for state enactment. The passage of bills like these, drafted so that they are in conformity with the Federal laws, will extend the regulation of foods, drugs and cosmetics to intrastate as well as interstate commerce. It will also result in more uniform requirements among the several states instead of the wide variation which exists at the present time.

The enforcement of the new Federal laws should assure more adequate protection of the health and comfort of the public, not to mention an ultimate beneficial effect on ethical business interests. Indeed, the ultimate value to business, in spite of the enormous labor and expense attendant upon compliance with the regulations, appears to be well recognized in the business world.

The Food, Drug and Cosmetic Act, although enacted several months after the amendments to the Federal Trade Commission Act, contains the basic regulatory powers over the manufacture, labeling and distribution of foods, drugs, devices and cosmetics. The Federal Trade Commission amendments deal with the control of false advertising statements, made in connection with the sale in interstate commerce of the same type of products. This separation of control was the result of a disagreement between the Senate and the House of Representatives as to where the control of advertising should be placed; the former believing that control should be vested in the Department of Agriculture, the latter that it should be vested in the Federal Trade Commission. From the legislation enacted, it can be seen that the original opinion of the House of Representatives prevailed, the control of the

advertising being vested in the Federal Trade Commission. The provisions of these amendments to the Federal Trade Commission Act with respect to the advertising of foods, drugs and devices will be discussed subsequently.

The new Food and Drug Act is not so complete a piece of legislation as a number of its proponents desired, but it is a great improvement over the original act. It brings instruments, apparatus and contrivances intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease, or designed to affect any bodily structure or function, under federal supervision and control for the first time. It also regulates the sale of all cosmetics except toilet soap, and outlaws all cosmetics which might be injurious to users. These provisions with regard to cosmetics are also improvements over the old law because, at the time of the original enactment, cosmetics had not assumed the great importance which they now have in industry. It had become essential that some regulation be imposed because of the potentially and actually harmful ingredients used in some of the cosmetics.

Whether dentifrices and mouth washes will be considered as drugs within the meaning of the Food, Drug and Cosmetic Act will apparently depend on the claims made for the individual products. The tendency on the part of the regulatory bodies appears to be to consider these products as cosmetics. Evidently, the therapeutic claims for such products will be deleted or scientific evidence to substantiate the claims will be developed.

The Secretary of Agriculture is authorized by the new act to establish standards of quality for all kinds of foods. Manufacturers of foods for which the government has not prescribed standards and definitions of identity are required by the new act to attach labels which indicate the common or usual name and the ingredients.

The Food, Drug and Cosmetic Act contains important provisions with respect to the introduction of new drugs. Before a new drug can be introduced on the market, the manufacturer or distributor must make application to the Secretary of Agriculture stating the composition of the drug and covering investigations that have been made concerning its safety for use and methods used in manufacture, with a sample of the drug and specimens of proposed labeling. The scope of this new provision becomes more evident when it is recalled that the term "drug" as defined in the act means all articles intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease, except instruments, apparatus and contrivances. These provisions are designed to enable the federal government to prevent a recurrence of such a tragedy as the widely publicized elixer of sulfanilamide case, which resulted in scores of fatalities among persons who made use of the drug.

Another improvement in the law concerns the regulation of therapeutic devices. It requires that all drugs, diagnostic and therapeutic devices, including those sold on the basis of the prescriptions of physicians, dentists and veterinarians, must be labeled with adequate directions for use. The Secretary of Agriculture is authorized to adopt regulations exempting drugs and devices from this requirement in case such labeling is not necessary for the protection of the public health; but these are the only exceptions to the previous requirement.

The Food, Drug and Cosmetic Act does not provide standards for the regulation of the quality of therapeutic devices, nor does it authorize any agency of the government to fix such standards. In this respect, the amendments are somewhat deficient, but it is hoped that the labeling requirements will afford some protection to the public in the absence of more complete control.

The Secretary of Agriculture is authorized to seize any shipment of goods cov-

ered by the act whenever he has probable cause to believe from the facts found, without hearing, that the articles are misbranded and are dangerous to health, or that the labeling is fraudulent or would be in a material respect misleading, to the injury or damage of the purchaser or consumer. After this seizure, the propriety of the action shall be adjudicated by a federal district court under regulations established in the law.

Recently, the Federal authorities seized several shipments of a popular headache remedy containing acetanilid, charging false and deceptive labeling because the package label did not bear adequate warning against the possible deleterious effects of the drug. Thus, it can be seen that a product may be seized under the law not only on the basis of representations made for it, but also because of failure of the manufacturer to provide proper and adequate information regarding its properties under the usual and ordinary conditions of use. Moreover, failure to comply with the law in either one or both of these respects is not excusable on the basis of ignorance or "good intentions." Unlike the original act of 1906, the new act does not require the Food and Drug Administration to prove that the defendant acted with wilful intent to deceive.

The amendments to the Federal Trade Commission Act were limited to the extension of the powers of the commission to permit it to eliminate false advertising of foods, drugs, devices and cosmetics. Under the original act, the commission had been granted jurisdiction over such types of commercial competition as price discrimination, but advertising was not considered to be a type of competition included in the act. During the thirty-two years following the enactment of the original law, it had become obvious that advertising was an important part of commercial competition, in which unfair methods could be just as harmful to the public welfare, and that some control should be exercised by the government.

The bill placing this control in the hands of the Federal Trade Commission has been criticized on several grounds. It was charged that it created a division of authority which would result in additional expense because of duplication of personnel, an overlapping of duties and conflict in jurisdiction. The bill was also criticized on the ground that the method of procedure which must be followed by the Federal Trade Commission was not adapted to the most effective and rapid enforcement of the provisions.

In spite of these criticisms, the power to control the advertising of foods, drugs, devices and cosmetics was vested in the Federal Trade Commission. The aggressiveness of the Federal Trade Commission in applying its authority has recently prompted unfavorable comment in the trade press. On several occasions, the commission has obtained injunctions prohibiting the sale of articles, pending final consideration of the case. Among these products were "cures" for menstrual disorders, an obesity "cure" containing dinitrophenol and a "cure" for alcoholism. Several advertising agencies have entered into stipulations with the commission. This is a move of some importance, since the advertising agencies were held jointly responsible with the vendors of the preparations under consideration.

The 1938 amendments to the Federal Trade Commission act provide that false advertising statements about foods, drugs, cosmetics and devices are to be considered unfair or deceptive acts or practices within the meaning of the original act and that it "shall be unlawful for any person, partnership, or corporation to disseminate, or cause to be disseminated, any false advertisement" of such products.

The term "false advertisement" is defined in the law as including "any advertisement other than labeling, which is misleading in a material respect." The definition also provides that in determining whether an advertisement is mislead-

ing, the commission may take into consideration not only stated representations, but also failure to reveal material facts which may be of importance in respect to the use of the product.

It further states that if there is a disagreement among qualified scientific persons concerning the truth of an advertising statement, it will not be considered misleading if the advertisement clearly states that this difference of opinion exists. Even if this statement of difference of opinion is not made, it is still necessary for the government to prove the misleading character of the statement.

These additional qualifications in the definition of "misleading advertising" rob the definition of a considerable amount of its value and make it difficult to prove that an advertisement is misleading if there is any scientific disagreement about the virtues of a product. They inject a varying standard when the definition should be as unambiguous as it is possible to make it.

The term "devices" is defined in the act as meaning "instruments, apparatus and contrivances, including their parts and accessories, intended (1) for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in man or other animals; or (2) to affect the structure or any function of the body of man or other animals." This definition appears to be very extensive and almost any therapeutic device would appear to be included. Devices such as dentures would clearly be covered, as they are unquestionably "apparatus" to "affect the structure or function of the body of man. . . ."

The penalty for circulating false advertisements about these articles will, in most cases, be restricted to the issuance of a cease and desist order following a hearing on the subject. The commission may bring criminal charges against an advertiser, but only when it can be proved that the use of a commodity may be injurious to health, or in the case of a deliberate fraud. Neither of these types of cases can be expected to occur with great frequency, and both would ordinarily be quite difficult to prove. If the criminal charges are proved, the advertiser becomes liable to both fine and imprisonment. For a first violation, the maximum penalty is $5,000 or six months in prison, or both.

If the Federal Trade Commission has reason to believe that any person is about to disseminate false advertisement of a food, drug, device or cosmetic and that the interest of the public requires that the dissemination of that advertisement be prevented or suspended pending final action by the commission, the commission may appeal to a court for an injunction or restraining order. The court may issue the injunction if it does not delay the delivery of any particular issue of a newspaper, magazine, periodical or publication, published at regular intervals, provided the publisher has not purposely concealed the misleading character of the advertisement. The last requirement may hinder the issuance of an injunction in some of the cases, but, on the whole, this method of procedure should be of value in protecting the public when prompt action appears to be necessary.

Since the most common procedure to be used by the Federal Trade Commission in the control of false advertising is that leading up to the issuance of a cease and desist order, it is of interest to outline the process usually followed. An application for a complaint may be made by any person, partnership, corporation or the commission itself, calling the attention of the commission to any unfair or deceptive act or practice in interstate commerce. If the commission believes that a proceeding by it would be to the interest of the public, it may issue a complaint and call for a hearing to be held not less than thirty days after service of the complaint. At the hearing, the advertiser may show why a cease and desist order with respect to these advertising statements should not be issued. If, upon the facts presented at the hearing, the commission decides that

there has been a violation of the law, it may order the violator to cease and desist from such violations. The advertiser then has sixty days within which to appeal to a United States Circuit Court of Appeals for a review of the order. That court may affirm, modify, set aside or refer the order back to the commission for the taking of testimony.

It is obvious that this procedure is cumbersome and the expense that it necessitates is a burden upon the advertiser. If it were the only method of obtaining compliance with the law, the commission would probably never achieve any great amount of success. The procedure by which the commission can eliminate most of the delay incident to the issuance of a cease and desist order and still obtain the same compliance with its wishes is termed a stipulation. A stipulation is described by the law as follows:

> In proceedings prior to the service of complaint by the commission, the commission may, in its discretion and in the public interest, permit respondents to dispose of cases by stipulations, in which stipulations the respondent agrees to cease and desist from the unfair methods of competition or deceptive acts or practices. The disposition of cases by stipulation is regarded as a privilege and not a right. . . . The commission reserves the right to refuse to extend this privilege.

This power of the commission has proved remarkably effective in obtaining an early cessation of false advertising claims. It can be and has been criticized from almost every angle except its effectiveness in speeding up the work of the commission. It is alleged that it puts the smaller companies in a more unfavorable position because they cannot afford the expense occasioned by the regular procedure, leading to the issuance of a cease and desist order, and therefore are forced to agree to a stipulation. It is also alleged that it permits the commission to threaten a criminal action to force agreement to a stipulation and also that it permits the disposition of cases without an opportunity for a judicial review.

From the commission point of view, it may be said that the stipulation is entirely voluntary, and any advertiser who feels that he is being unjustly treated may demand a hearing.

Regardless of the merits of these arguments, the right to enter into a stipulation is granted in the law and is the most effective method of enforcement available to the commission. Unless further amendments are made in the law, there appears to be little likelihood that its use will be discontinued.

It is obviously impossible to consider in detail, within the confines of this article, all phases of the new federal laws or even to comment adequately on the implications, potentialities or present effectiveness of the many provisions of these laws. It is not unreasonable to expect, however, that the proper administration of these laws will bring about a vast improvement in matters directly related to public health and public welfare. The full responsibility for the proper administration of these laws cannot rightfully be placed upon those officially charged with that responsibility. The proper functioning of these laws, in common with other laws, depends in large measure on the support of those whom they are designed to benefit and, above all, on the support of scientific and professional groups and individuals. The laws were passed in the face of strenuous opposition. There is no good reason to believe that the opposition has disappeared.

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THE POSTERIOR OCCLUSAL PLANE IN FULL DENTURE CONSTRUCTION

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IN full denture construction, the prosthodontist is responsible for developing a balanced occlusion that is compatible with all functional movements of the mandible as well as with the retention of the individual dentures. It is well known that the problem of occlusion in full dentures is the direct antithesis of that which is found in normal dentition. Force in mastication in denture wearing is directed over the entire denture base, while force in mastication in a dentulous person may be borne by the parodontium of one tooth. Because of this variance, one should not make direct comparisons between denture teeth and normal teeth. The prothodontist, however, should have a definite insight into normal tooth arrangement and function, so that deviations may be made to suit the needs of the case at hand.

The horizontal occlusal plane, running from the incisal edge of the lower central incisor to the distobuccal cusp of the lower first molar, is undoubtedly the most important single plane to be determined in full denture work. This plane has been related to Camper's plane, which runs from the alae of the nose to the tragus of the ear. Broomell[1] discovered this plane relationship, and Snow[2] popularized the conception.

A deviation from this horizontal occlusal plane found in nature is the so-called curve of Spee. Much significance has been attached to this curve by various men because of its supposed connection with the movement of the mandible in function. Masaru Nagao,[3] with others, doubted this relationship. Nagao reduced Spee's findings to three contentions and then presented his research work to refute them. Spee wrote:

> The development of the curve of Spee is dependent upon the presence of the *tuberculum articulare*. In other words, the curve of Spee does not exist on a skull which has no *tuberculum articulare*. In skulls possessing the curve of Spee, when the anteroposterior movement of the lower jaw takes place, the summits of the cusps of the bicuspids and molars of the lower jaw and the condyle move either on an arc of the same circle or on arcs of two circles which are homocentric: the cusp on one circle, the condyle on the other. We may deduce from this that the steeper the path of the condyle of the lower jaw during anteroposterior movement, the shorter will be the radius of the cylinder surface, or vice-versa. There is a close relation between the curve of Spee and the sagittal movement of the jaw during mastication. That is to say, we cannot recognize the curve of Spee on any skull which shows no sagittal movement of the jaw during mastication.[4]

Nagao found exceptions to all of the foregoing contentions in a comparative study of the mammalia. The muskrat and the opossum, for instance, have a considerable curve of Spee without a *tuberculum articulare*. Also, he states:

> It is evident that, so far as my own observations go, the statement that the steeper the path of the condyle of the lower jaw during anteroposterior movement, the shorter will be the radius, or vice versa, cannot be accepted.[5]

In relation to movement, Nagao says in substance:

My observations on the skulls which exhibit ideal occlusion induce me to conclude that all points in the lower jaw move downward and forward as a whole, thus producing the movement of the "parallel displacement"[6] . . . not on the curve of Spee or on a curve homocentric to it. . . . Animals such as the pig, guinea-pig and rodent, in which movement of the lower jaw is principally anteroposterior, do not have a curve of Spee, but do have a straight line joining the posterior cusps. Therefore, we see that in some of the mammals the curve of Spee is found irrespective of the presence or absence of the anteroposterior movement of the lower jaw during mastication. It naturally follows that the close relation said by Spee to exist between the curve of Spee and the anteroposterior movement of the lower jaw cannot be accepted without modification.[7]

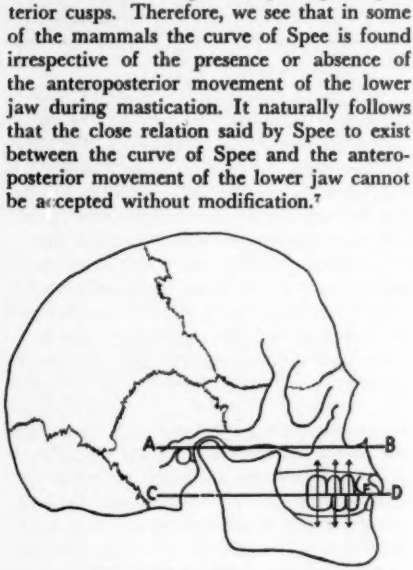

Fig. 1.—Sagittal section of skull, showing buccal occlusion. AB, Camper's line. CD, horizontal occlusal plane, parallel to AB. F, tip of maxillary cuspid. The arrows indicate the direction of the occlusal forces.

J. Leon Williams[8] writes:

Dr. Nagao reaches the conclusion that there is no essential relation between the form of the glenoid cavity and the curve on which the masticating teeth function because the curves rarely coincide in nature. This seems to me a striking instance of literal interpretations of facts missing the spirit of truth. If Nature had not given us a strong suggestion of this relationship, so strong as to make clear the evolutionary tendency, who would ever have thought of a way in which that relationship could be so perfectly established as in the demonstration which I have given you.

Many duplications of the foregoing statements in reference to "ideal occlusion" could be given. In relation to the spherical congruency theory of Maxwell, for instance, Bignell says:

Undoubtedly this ideal occlusion does not exist in the human race, but only through a comprehensive understanding of what constitutes the ideal can we hope to appreciate it.[9] . . . The spheroidal theory of occlusion has proved to be a very useful fiction in clinical practice. Such an ideal arrangement will, in all probability, never be found in nature.[10]

This apotheosis of the ideal occlusion of teeth, with each individual or group having contradictory notions as to what constitutes the ideal, has resulted in confusion. When one remembers that teeth are formed and erupt as entities of a complete dentition, this process being definitely influenced by heredity, environment and habits, it is no wonder that there never has been what could be considered an ideal occlusion for every one. Occlusion is peculiar to the individual, and the fact that it may not be what the operator considers ideal is no reason for changing it, unless there are definite symptoms of disease.

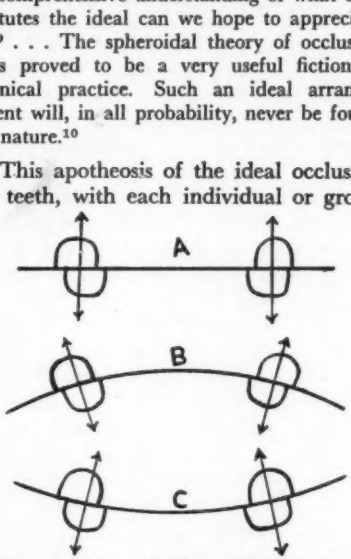

Fig. 2.—Three possible types of cross-sections through posterior occlusal plane. A, horizontal transversity. B, Avery or Pleasure transverse curve. C, Monson transverse curve.

Case[11] writes:

It proves that the inherited standard type of normal occlusion of the human dentures, contrary to the opinion of many teachers of modern orthodontia, has come down to us essentially unchanged through the ages from the prehistoric men of the "old stone age," and kept in line through "the law of natural selection" ("survival of the fittest") and its perfect adaption to needs.

Even as far back as the second "interglacial period"—200,000 to 350,000 years ago—the forms, numbers and relative position of the teeth and their buccal occlusion was essentially the same as the standard normal occlusion of today, and though in earlier stages of that vast period, the jaws were of a heavier type and bimaxillary protrusive mouths, enhanced by chinless mandibles, showed their distant descent from their anthropoid progenitors, the occlusion of the teeth, their alignment and arch form—even the canines which have thrown off nearly all their carnivorous characteristics—were all practically the same as today.[11]

In full denture work, therefore, as we have no "ideal" occlusion in nature, we can disregard a few of the supposedly fundamental tenets that have been set down in the past as necessary and give the patient an occlusion that functions best for his individual needs. One of the greatest reversals of these tenets was the introduction by Rupert E. Hall[12] of the cuspless tooth. The main advantage of this type of tooth over the cusped tooth lies in the fact that it is a mechanical expedient to meet the changed conditions that are found in the edentulous mouth. Its efficiency compares very favorably with that of normal dentition[13] and unquestionably preserves the alveolar ridge because of minimization of lateral stress. As there are no cusps, the registrations do not have to be taken on two different horizontal planes to compensate for the distance from the top of the cusp to its sulcus[14]; which simplifies the construction of the dentures, The criticism that the bicuspids present an unnatural appearance can be met by setting the first bicuspid slightly lingually to the cuspid. It is readily noticeable that in the use of this type of tooth, the occlusal plane is changed from a plane where possibly only two or more tips of the cusps touched to a plane where there are no cusps and the entire occlusal surface is in contact with the plane. Furthermore, as Dr.

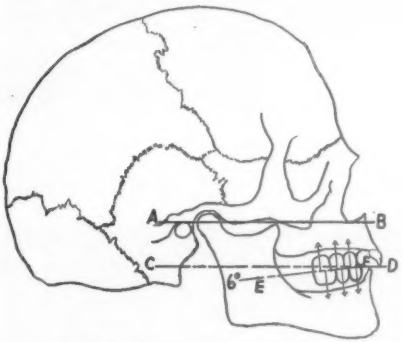

Fig. 3.—Sagittal section of skull. The data are the same as in Figure 1. EF, occlusal plane running downward and backward at angle of 6 degrees from hypothetical horizontal occlusal plane CD. Direction of arrows upward and backward indicates how occlusal forces will aid retention of the maxillary denture during mastication.

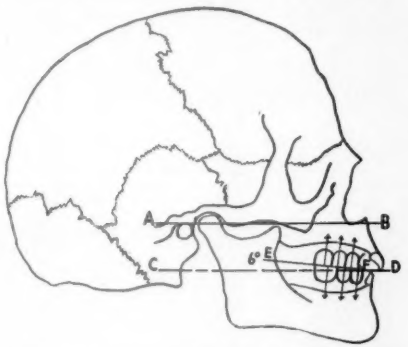

Fig. 4.—Sagittal section of skull. The data are the same as in Figure 1. EF, occlusal plane running upward and backward at angle of 6 degrees from hypothetical horizontal occlusal plane CD. Direction of arrows downward and backward indicates how occlusal forces will aid retention of the mandibular denture during mastication.

Pryor[15] states, the "leaders in prosthetic thought admit that the anatomic posterior tooth is not a practical tooth to use in full denture work, because the conditions under which natural and artificial teeth function are entirely different."

Setting these teeth to a curve of Spee varying in radius from 4 to 6 inches has been advocated. For the utmost in efficiency, if we desire to use a curve of Spee, the longer the radius the better the dentures will function. M. A. Pleasure[16-17] made another recommendation, founded upon a scientific interpretation of occlusion in reference to the transverse curve of the teeth. He found that by setting the

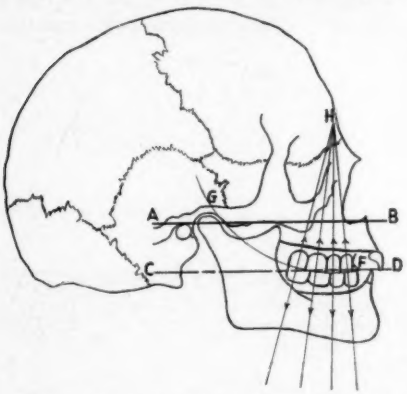

Fig. 5.—Sagittal section of skull illustrating spherical theory of occlusion. GF, curve of Spee. H, glabellar region toward which occlusal forces of upper posterior teeth are directed. There is wide dispersion of occlusal force on the mandibular denture.

teeth to an anti-Monson transverse curve, greater stability in the lower denture can be obtained. His work on this subject was another blow to the spherical theory of occlusion. He states:

> It is our belief that if the teeth followed the surface of such a sphere in function, they would gradually wear into closer and closer apposition with the sphere, and not out of apposition, as on the specimens displayed.[18]

We have found that curves of various radii in the set-up can be used on the same individual with no loss of balance. We can also demonstrate that no curve is necessary. All that is needed is to set the teeth to a horizontal plane that may or may not be parallel to Camper's line. Figure 1 is a diagrammatic picture of a sagittal section of a skull showing Camper's line AB and the occlusal plane CD horizontal and parallel to it. Such a posterior plane for buccal occlusion is definitely indicated in such cases as of a

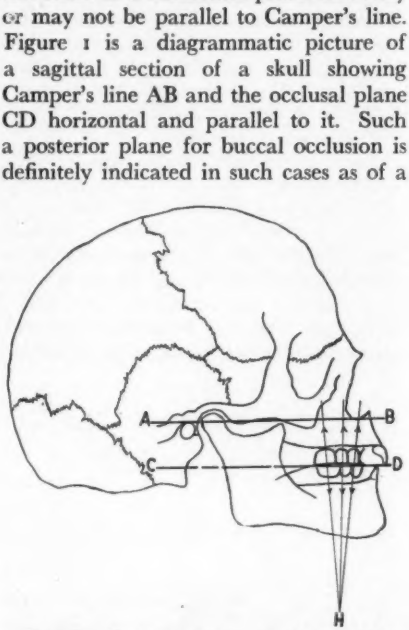

Fig. 6.—Sagittal section of skull showing reverse curve of Spee, set-up which favors mandibular plane.

Fig. 7.—Instrument for determining horizontal occlusal plane.

unilateral or a bilateral cross-bite or in cases having the same retentive factors. With such a set-up, in cross-section we can set the teeth in one of three ways: to form (1) a horizontal transverse plane, (2) an Avery or a Pleasure transverse curve or (3) a Monson or spherical trans-

verse curve. (Fig. 2.) The indications for their use are as follows: If both ridges present approximately the same retentive conditions, a horizontal set-up may be used. (Fig. 2A.) If the lower is unfavorable as compared to the upper, the Avery or Pleasure curve is used. (Fig. 2B.) If the upper is unfavorable as compared to the lower, the Monson curve is used. (Fig. 2C.) The directions of the arrow show how the masticating force will be exerted, in cross-section.

an unfavorable maxillary ridge and a favorable mandibular ridge for retention; or in a full maxillary case and a partial mandibular in which the maxillary case has small ridges, no tuberosities and a flabby ridge in the anterior region. The arrows indicate the direction of masticating force, upward and backward, tending to seat the maxillary denture at each stroke of mastication rather than propelling it anteriorly as when a plane like that in Figure 4 or Figure 5 is used. The oc-

Fig. 8.—Left: Buccal aspect of set-up showing occlusal surfaces of posterior teeth parallel to horizontal occlusal plane. Center: Transverse aspect showing entire occlusal surface to be parallel to horizontal occlusal plane. Right: Set-up presenting features diagrammed in Figure 1.

Fig. 9.—Left: Buccal aspect with occlusal plane directed downward and backward from hypothetical horizontal plane. Center: Transverse Monson curve. The buccal section of the occlusal surface touches the occlusal plane. Right: Set-up illustrating features diagrammed in Figure 3.

A deviation from the horizontal occlusal plane as described above is shown in Figure 3. This set-up presents a straight buccal plane, yet is at an angle of from 4 to 6 degrees downward and backward from point F (cuspid region) on the horizontal occlusal plane. This plane is indicated in those persons having

clusal plane in cross-section can either be horizontal, A, Figure 2, or present a Monson transverse, C, Figure 2, curve. The Monson curve is indicated unless there is an extreme cross-bite or a prognathism of the mandible, in which case a straight plane can be used.

Another deviation from the horizontal

occlusal plane is diagrammed in Figure 4. This set-up, like that of the preceding one, presents a straight buccal plane running upward and backward at an angle of from 4 to 6 degrees from point F (cuspid region), from the hypothetical horizontal occlusal plane. Such a plane is indicated in those cases wherein we have an unfavorable mandibular ridge for retention as compared to the maxillary ridge. The direction of the arrows shows that the force applied to the mandibular denture will be downward and backward, tending to seat the mandibular denture. The teeth in cross-section may present either a straight plane, as in Figure 2A, if there is a decided overjet of the maxillary teeth, or the Avery or Pleasure curve. (Fig. 2B.)

The conventional set-up with the curve of Spee is shown in Figure 5. This set-up, with the Monson transverse curve (Fig. 2C), definitely favors the upper denture, as the points of the arrow indicate. A reverse curve buccally as well as transversely (Fig. 2B) is shown in Figure 6. The occlusal forces, as demonstrated by the arrows, will aid the lower denture and can be used in those cases where indicated.

The horizontal occlusal plane in full denture construction is first established on the bite-blocks. The instrument illustrated in Figure 7 will facilitate this operation. The correct centric relation is obtained by use of a gothic arch tracing and the case is mounted on a suitable articulator. The six maxillary anterior teeth are selected and set according to the laws of esthetics. Then a plane is selected for the posterior teeth, with the above-mentioned diagrammatic formulae in

Fig. 10.—Left: Buccal aspect of case with occlusal plane directed upward and backward from horizontal plane. Center: Avery or Pleasure transverse curve; lingual section of occlusal plane with which buccal section is not in contact. Right: Set-up illustrating features diagrammed in Figure 4.

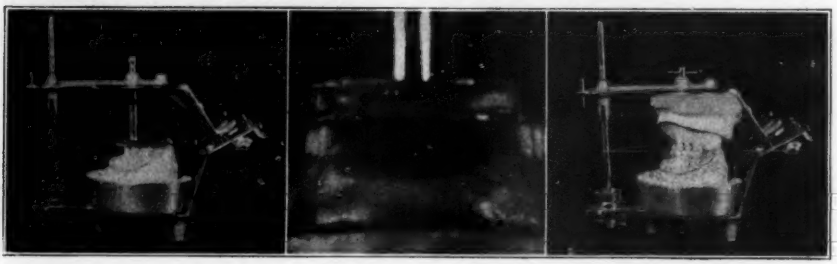

Fig. 11.—Left: Buccal aspect of case with reverse curve of Spee. Center: Transverse section of Avery or Pleasure curve. Right: Set-up showing features represented digrammatically in Figure 6.

mind. If, for instance, a horizontal plane with no transverse curve is decided upon where the ridges present relatively the same retentive features, a flat plane is attached to the upper bow of the articulator on the same level as the previously determined horizontal occlusal plane. Then the complete complement of mandibular teeth are set to this plane. In the photographs, the anterior teeth are eliminated to show the posterior occlusal plane and transverse plane to better advantage. Figure 8A shows the sagittal or buccal aspect of the teeth with the occlusal surface in contact with the horizontal plane former. B shows a cross-section in the region of the bicuspids with both buccal and lingual areas of the occlusal surface in contact with the occlusal plane former. C shows the maxillary and mandibular teeth in occlusion, indicating that the occlusal plane is on the same level as the rubber band to which the horizontal occlusal plane in the bite-blocks were molded. As the anterior teeth should not be in contact in a masticating stroke other than incision, all force will be directed at right angles to this posterior occlusal plane, as diagrammed in Figure 1.

When the maxillary ridge is unfavorable and the occlusion as diagrammed in Figure 3 is desired, the procedure is the same as above described until the operator reaches the point of setting the mandibular posterior teeth. Then, from the horizontal plane, the teeth will present the sagittal or buccal aspect, as shown in Figure 9A. It will be noted that the plane of occlusion drops downward and backward at an accentuated angle of approximately 6 degrees. B shows the transverse Monson curve, with a lingual pitch, as shown. C shows the complete complement of maxillary and mandibular teeth forming an occlusal plane that runs downward and backward, in its relation to the rubber band, which designates the hypothetical horizontal occlusal plane.

Figure 10 shows a case wherein, as explained in diagram 4, it is desired to favor the mandibular ridge. A shows the buccal aspect. In obtaining this type of plane, the first bicuspid should touch the horizontal occlusal plane as shown in C. The remaining teeth are progressively raised, making a flat plane from the buccal aspect, yet at an angle of from 4 to 6 degrees upward and backward. A shows the distance that the plane former is raised from the horizontal occlusal plane as shown in the wax in the region of the molar. An anti-Monson or transverse curve is shown in B. This occlusal plane is shown in relation to the hypothetical horizontal by comparison with the rubber band in C.

Figure 11 A, B, and C shows a reverse Monson curve sagitally as well as transversely for use in those cases where it is desired to increase retention of the mandibular denture. This type of occlusion does not exhibit any more retention than the type described above. It is illustrated to show the wide diversity of posterior occlusal planes that can be used with advantage in an edentulous person. All of these illustrations were made from cases constructed for the mouth of Peter B. Christensen, a Chicago dentist. Every case functioned successfully in the mouth, showing the adaptability of the mandibular joint. The temporomandibular joint, which has been likened by Dr. La Due[19] to a universal joint, will function perfectly with these modifications in tooth positioning. Some such modifications are even found in nature.

R. O. Schlosser says of the curve of Spee:

> The curvature runs from a well-defined arc in most cases to a nearly or quite flat surface in a few instances. A few cases have come under the notice of the writer in which the curvature of the occlusal surface was reversed. In other words, instead of the convexity presenting downward, the occlusal surface was convex upward. Such cases are rare, however, and within the writer's observation occur only when the occlusion is

abnormal, the teeth in the lower protruding beyond those in the upper arch.[20]

It is well known that three points are necessary to chart the movement of any solid in space. The mandible, being a solid, has three points or areas that are directly concerned with its movement, the right and the left condyle and the teeth. In any edentulous case, we have the right and the left condyle present, but we can supply teeth. By using judiciously a non-anatomic tooth with any of the foregoing modifications, a balanced occlusion can be obtained with the utmost in retentive force. To obtain balance in protrusion, when considerable overjet is present, it may be necessary to set a balancing tooth over the retromolar pad of tissue on the lower denture to effect balance in the posterior region when the anterior teeth are in contact.

It is seldom that more than three posterior teeth are necessary. The fact that the manufacturers supply posterior teeth carded in sets of eight is no reason that they all have to be used. In observing skulls, the most wear will be found on the first molar and second bicuspid teeth. From this, it can be reasonably assumed that the stress of mastication is applied in this region. The distal surface of the last tooth used should be on the perpendicular, erected from the horizontal occlusal plane to the point where the alveolar ridge turns upward to meet the ramus. This will prevent the "rocking chair" action on the lower denture, which is noted when teeth are used posteriorly to this point. The more teeth we use, the greater the chance of error and of friction between the occlusal surfaces without an increase in retention or function.

The foregoing statements should not be construed as indicating that these teeth can be set haphazardly, without reason. To get the right and left planes even and on the same level, according to the formulae presented above, requires as much skill and dexterity as are needed for the most difficult set-up of cusped teeth. The results with this technic will go far toward clearing up the mystery of occlusion. I firmly believe, however, that it is a step in the right direction to meet individual needs in occlusion, rather than to attempt to make a stereotyped "idealized" occlusion meet individual needs.

SUMMARY

It should be recognized that occlusal forces are different in dentulous and edentulous mouths. Therefore, what has been considered as a normal arrangement of teeth in nature can be modified to suit individual edentulous needs. The curve of Spee and its accompanying spherical theory of occlusion were shown neither to have a comparative anatomic background nor to afford a practical solution of the problem of occlusion in all cases. Non-anatomic teeth, such as the inverted cusp tooth, are a mechanical deviation to meet the changed conditions found in an edentulous mouth. Modifications of the transverse curve have been made for years. It is herein recommended that the curve of Spee be modified or eliminated, to aid in retention in those cases wherein it is indicated.

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180 North Michigan Avenue.

ORAL INFECTION AND GASTRO-INTESTINAL DISEASE

By Karl A. Meyer,* M.D., Chicago, Ill.

In the present age of medicine, the mouth is about to be restored to the human body from which it was conceptually separated about a century ago. This process of readjustment has not yet been completed, but is still going on.

Edward Rist remarked, in an essay, "In every country, our confrères have their phantoms and their ghosts. For the Englishman it is uric acid, for the German the exudative diathesis, for the American focal infection."

Although consideration of oral sepsis as a source of focal infection has been almost done to death by its friends, it remains a very solid contribution to medicine. It is of interest to note that Benjamin Rush, one of the great pioneer American physicians, was one of the first following Hunter to recognize the relationship between oral sepsis and generalized systemic disease. He writes:

When we consider how often the teeth, when decayed, are exposed to irritation from hot and cold drinks and ailments, from pressure by mastication, and from the cold air, and how intimate the connection of the mouth is with the whole system, I am disposed to believe they are often the unsuspected causes of general, and particularly of nervous diseases.

When we add to the list of those chronic diseases the morbid effects of the acrid and putrid matters, which are sometimes discharged from the carious teeth, or from the ulcers in the gums created by them, also the influence which both have in preventing perfect mastication, and the connection of that animal function with good health, I cannot help thinking that our success in the treatment of all chronic diseases would be very much promoted by directing our inquiries into the state of the teeth in sick people, and by advising their extraction in every case in which they are decayed.

Now we have learned that all causes of oral sepsis are a factor in disease. Among the oral conditions that constitute the main source of sepsis are (1) degeneration of vital pulps; (2) periapical infection around pulpless teeth or teeth with non-

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vital pulps; (3) caries; (4) the presence of dental cysts; (5) residual infection after extraction; (6) impaction and non-eruption of teeth; (7) pyorrhea; (8) gingivitis and stomatitis or any inflammatory conditions of the mucous membranes such as Vincent's infection; (9) mouth filth due to tartar, débris, poor bridgework, etc.; (10) furring of the tongue, and (11) infection of the lingual tonsil.

The organisms most frequently responsible for focal infection are *Streptococcus hemolyticus, Streptococcus viridans, Staphylococcus aureus* or *albus,* the pneumococcus and the colon bacillus. Specific types of organisms such as the tuberculous, diphtheritic, etc., are not here considered in the chronic focal infection group. *Streptococcus viridans* is the chief offender in lesions of the teeth and gums. The local focus of infection should be regarded not only as a portal of entry, but also as a site in which the organisms multiply, develop their virulent properties and, perhaps, as Rosenow suggests, acquire a specific pathenogenicity and affinity for certain tissues.

We may differentiate the channels through which oral infection may become a factor in disease of the digestive system as follows: 1. Once the defensive powers of the tissues have been overcome, there is systemic invasion of the toxic products and finally of the bacteria themselves, by way of the blood or lymph stream. 2. The products of decomposition and bacteria may be swallowed and so enter the gastro-intestinal tract. 3. There may be direct extension of the oral pathologic process to the gastro-intestinal mucosa. 4. Reflex disturbances of the normal alimentary secretions and peristaltic rhythm may be produced. 5. Mechanical disturbances may result from insufficient mastication. 6. Toxemia may result in endocrine exhaustion, which indirectly may cause gastro-intestinal infection.

The reaction in the part thus secondarily invaded may result in a serofibrinous or purulent exudate, proliferative changes or necrosis. Just which variation of pathologic change will take place depends on the peculiar susceptibility of the tissues and the number, character and virulence of the parasitic invaders.

Focal sepsis may produce, in the way of symptoms, a general state of invalidism characterized by general lassitude, headache, mental depression, neuromuscular and articular pains, febrile attacks, malnutrition and anemia. Occasionally, the blood deterioration is so extreme that the clinical picture may suggest a pernicious anemia.

It may produce definite lesions by causing leukoplakia and, by constant irritation, malignant degeneration in and about the buccal cavity. It may extend into the sinuses, middle ear, pharynx and salivary and lymph glands. It has been clearly demonstrated that it may cause chronic myocardial disease with various functional disturbances of the heart, ocular lesions (iritis, choroiditis, retinochoroiditis, optic neuritis) and subacute and chronic non-tuberculous infections of the lungs, and that it is even a contributory factor in arteriosclerosis and arterial hypertension. Thus, it is certainly understandable that lesions of the gastro-intestinal tract can be produced similarly, whether by embolization or direct extension.

In pyorrhea alveolaris especially, even if there is no direct invasion of the blood or lymph stream, the constant swallowing of the purulent secretion may cause functional derangement of the stomach and duodenum, first, as a hyperchlorhydria and finally as a diminished chlorhydria, pylorospasm and cardiospasm; this, continued, causing organic disease such as duodenitis, duodenal ulcer, gastritis and peptic ulcers.

First attempts to demonstrate an etiologic relation between bacterial infection and peptic ulcer were published in 1913 and 1923, by Rosenow. In 61 per cent of rabbits given injections of streptococcal

strains recovered from peptic ulcers, he found hemorrhagic erosions and ulcerations. He showed that the lesions reproduced resembled those of the patients, not only as to situation but also as to appearance and a tendency to chronicity, perforation and hemorrhage. Subsequently, he advanced the theory that the usual form of gastroduodenal ulcer may be attributable to a localized infection by streptococci isolated from foci of infection which have a special selective affinity for the mucous membrane of the stomach and duodenum. Hickel and Hufford, Haden and Nakemira (1924) have done the most to corroborate this work of Rosenow.

The old idea of Cruveilhier that gastritis and duodenitis preceded the development of an ulcer is being emphasized by several of the European workers (Orator and Puhl) and is confirmed by Walters, Snell and Sebening.

The bactericidal effect of normal gastric juice is essential as a barrier to infection of the remainder of the gastro-intestinal tract. We know this also from the studies of the gastro-intestinal tract, which have shown that, during the early stage of life, while there is very little gastric acidity and little protein-digesting enzyme is present, infants are prone to bacterial infections of the small and large intestine. The determination of the relative effectiveness of the gastric barrier probably depends on: (1) the number of organisms swallowed, this depending on the amount of saliva and condition of cleanliness of mouth and food; (2) the concentration of hydrochloric acid in the stomach, and (3) the relative length of exposure to the gastric juice and the relative resistance of the individual organisms to acid.

Many clinical specialists have expressed opinions on the subject and have enumerated a great variety of diseases believed by them to be caused by oral infection. Nearly every gastro-intestinal disease has been attributed by some one to oral sepsis.

However, Satterlee came to the following conclusions concerning the effects of removal of oral infection in gastro-intestinal conditions. In his series of 1,512 patients, he noted that there were persistently poor results after operations for appendicitis, cholecystitis, peptic ulcer and similar conditions despite postoperative care, unless oral sepsis was corrected. He further noted that results were satisfactory after the foci were removed, and lastly that symptoms of duodenal ulcer, cholecystitis, gastro-enteritis, colitis and non-specific diarrhea often subsided after elimination of the oral sepsis.

Eusterman came to similar conclusions; i.e., that (1) functional gastric and intestinal disorders are relieved by the removal of foci of infection; (2) such discharges from suppurative teeth, gingivae and sinuses may provoke subacute gastritis, phlegmonous gastritis and enteritis, with attendant symptoms, conditions that will probably become chronic in untreated cases, and (3) gastric and intestinal symptoms, transient and variable, are usually the result of embolic lodgment of organisms in gastric or intestinal walls, resulting in acute ulcers and diffuse or local hemorrhage erosions with or without local neurosis.

That there exists an intimate relationship between stomatology and gastro-enterology there can be no doubt even from this brief résumé. The obvious tendency in scientific medicine today is toward division of labor. This is, as might be expected, in the process of evolution, which is as it should be in any field of endeavor. However, this must not be permitted to reach the point where we lose sight of the human body as a finely balanced organism, naturally disturbed by impairment of any one of its parts. The fields of the stomatologist and the gastro-enterologist lie closer together than ever.

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INCISIVE CANAL CYSTS*

By R. P. Gingrass, M.D., D.D.S., Milwaukee, Wis.

Meyer[1] made the first report of an incisive canal cyst in 1914. Schroff,[2] in 1930, reported four cases. Meyer,[3] in 1931, reported an incidence of one in sixty-six, as determined by dissection of 600 cadavers. Stafne *et al.*[4] report an incidence of not less than one in every hundred patients. The diagnosis was made roentgenologically.

That the diagnosis of an incisive canal cyst is not easy in many cases, especially when the cyst is small and when it contains an unerupted or supernumerary tooth, is emphasized by Stafne and Austin.[5]

The following case histories emphasize some points that may aid the general practitioner in the diagnosis and treatment of this type of cyst.

REPORT OF CASES

Case 1.—A girl, aged 19, was referred for dental diagnosis because of an intermittent discharge of a small amount of pus from the region of the upper central incisors on the palatal side. The patient had been aware of the condition for the past year. On examination, no swelling was present. The mucous membrane was slightly reddened in the region of the incisive papilla. When the area was palpated, a small amount of pus escaped through a fistulous opening by the side of the papilla. Roentgenologic examina-

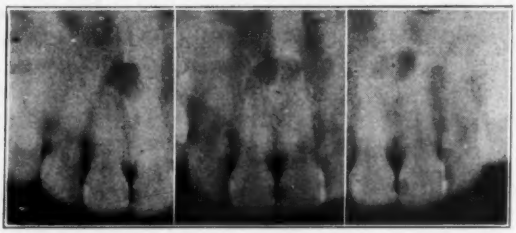

Fig. 1.—Incisive canal cyst in girl aged 19. A radiolucent area about 8 mm. in diameter is seen between the apices of the upper central incisors. The pulps of these teeth responded in a normal way to the electric pulp tests.

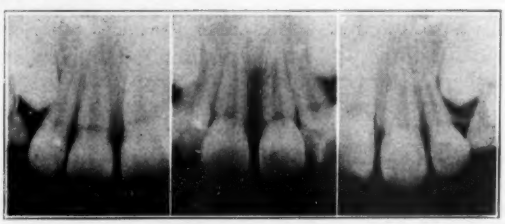

Fig. 2.—Incisive canal cyst in girl aged 9. The history of the case was essentially the same as in Case 1. The roentgen appearance was not definitely that of a cyst. Pulp responses were normal.

*Synonyms: Median anterior maxillary cysts; nasopalatine cysts.

tion (Fig. 1) revealed, between the apices of the central incisor teeth, a round radiolucent area which could be identified as a large incisive canal. However, in consideration of the history and physical findings, a diagnosis of incisive canal cyst must be made. At operation, a palatal flap was reflected and the contents of the canal were removed. No attempt was made to preserve the nasopalatine nerves and vessels. The canal was about 8 mm. in diameter. The microscopic diagnosis was epithelial cyst.

Case 2.—A girl, aged 9, came in with the complaint of an intermittent discharge of a small amount of pus from the region of the incisive papilla, which had been present for three years. The area had been lanced several times. There was a discharge of a few drops of pus on pressure over the region of the incisive papilla. Roentgenologic examination (Fig. 2) revealed no radiolucent area between the apices of the upper central incisors, but a round area of increased density. The significance of this area was not realized until after operation. In view of the clinical findings and previous experience, a diagnosis of incisive canal cyst was made and operation was recommended. Under general anesthesia, a palatal flap was reflected. Free pus escaped before the flap was completely reflected, the cyst apparently having been ruptured. The incisive canal was about 1 cm. in diameter. The contents were completely removed and the flap was sutured.

Fig. 3.—Incisive canal cyst in edentulous jaw of man aged 45. The teeth had been extracted two years previously. The patient was wearing a denture part of the time. The radiopaque shadow, partially obscuring the cyst, is caused by the nasal septum.

Case 3.—A man, aged 45, came in with the complaint of a periodic swelling and discharge of pus from the region of the upper right central incisor alveolus of six months' duration. Physical examination revealed a fistula on the crest of the ridge in the region of the upper right central incisor alveolus. Roentgenologic examination (Fig. 3) disclosed an incisive canal cyst about 1.5 cm. in diameter. The cyst was completely enucleated under local anesthesia.

Case 4.—A woman, aged 73, consulted the dentist because of swelling and pain which suddenly developed in the anterior part of the upper jaw. The patient's teeth had been extracted about five years previously. The dentist incised the swelling and there followed a free discharge of pus. Physical examination revealed a swelling almost obliterating the mucofold in the upper anterior region and which had an eggshell crackle on palpation. Pus was discharging from the incision. Roentgenologic examination (Fig. 4) revealed a large cyst in the median portion of the jaw, with the greater part of the cyst extending to the left. As the patient's general condition was very poor, palliative treatment only was carried out.

Fig. 4.—Cyst in woman aged 73. The central position of the cyst is suggestive of an origin in the incisive canal.

Case 5.—A man, aged 70, was referred for attention because of a cyst in the upper jaw.

The upper anterior teeth had been extracted two months previously. Pus continued to discharge from the left lateral incisor alveolus. Physical examination revealed swelling on the palate in the anterior part about the size of a walnut. Pressure on this area caused pus to be discharged through the left lateral incisor alveolus. Roentgen examination (Fig. 5) revealed a large cyst occupying the anterior part of the maxillae. The cyst extended laterad and dorsad as far as the antra. The microscopic diagnosis was epithelial cyst.

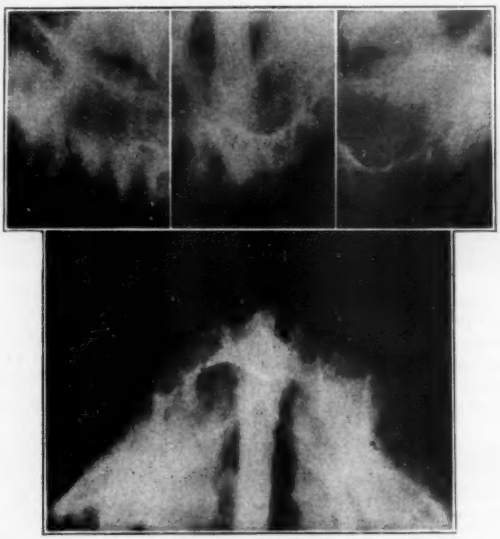

Fig. 5.—Cyst in man aged 70. As in Figure 4, the larger the cyst becomes, the more difficult it is to determine its origin.

COMMENT

Incisive canal cysts are not so unusual as was formerly believed. They arise, it is believed, from epithelial remnants from the nasopalatine duct. Embryologic data on the nasopalatine duct are meager. Difficulty in diagnosis arises when the cyst has reached a large size or contains an unerupted or a supernumerary tooth. It may then be confused with a radicular or a dentigerous cyst, when it involves the median anterior maxillary region. When incisive canal cysts are small we can identify the incisive canal and occasionally smaller canals within it. When the cysts are large, we have been unable to see anything that looks like an incisive canal. The treatment of an incisive canal cyst is the same as for any cyst.

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DENTAL EDUCATION

Including a Study of the Alleged Influence of Derogatory Medical Opinion on Its Institutional Initiation in 1840*

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I. GENERAL CONDITIONS PRECEDING ESTABLISHMENT OF THE FIRST DENTAL SCHOOL

The years between the close of the War of Independence and the end of the fourth decade of the nineteenth century were notable, in the history of American dentistry, for a cumulative demand for dental service, an increase in the number and distribution of dentists, a widespread extension of itinerant dental practice, and a menacing growth of quackery. . . . The medical schools and most of the physicians continued to ignore the dental aspects of the healing art. Dentistry was a trade that might be acquired during an apprenticeship, or undertaken without training and learned through unguided experience; and any one was free to practise [it], without public restraint. . . . The succession of important developments in the methods of [dental] practice throughout this period improved public appreciation of dentistry as an art, and increased the number of self-respecting prospective practitioners who sought the effective preliminary training that could be obtained by apprenticeship in the offices of established dentists.[1]

During this period of rapid evolution, there was increasing discussion of the desirability of institutional instruction for dental practice, either in projected dental courses in medical schools or in prospective dental schools. The growing professional spirit and purpose among an increasing number of responsible dentists (a) led to (1) the foundation of the first dental journal (1839) and (2) the establishment of the first national dental society (1840), and (b) solved the current problem of the most effective procedure for formal dental education by bringing about the creation of the first dental school (1840).

Within a period of practically one year, constructive leadership such as had never before appeared among dentists laid the foundations of publication, of organization and intercommunication, and of special education, on which has been based the modern evolution of the dental craft into the dental profession.[2]

The first dental school, the Baltimore College of Dental Surgery, was founded through the direct initiative of two leading Baltimore dentists—Horace H. Hayden (1769-1844) and Chapin A. Harris (1806-1860)—with the cooperation of other leading dentists and some physicians. The school, incorporated on February 1, 1840, was organized on February 3, 1840, by the election of Hayden as president and Harris as dean. Hayden was a surgeon in the War of 1812; a founder and first secretary of the Baltimore Physical Association (1818), later the Maryland Academy of Science and Literature; a founder and first president of the American Society of Dental Surgeons (1840); author of "Geological Essays" (1820), and discoverer of a mineral, named "haydenite" in his honor. He was awarded the honorary M.D. degree by the Jefferson Medical College (1837). Harris was a founder and first

*First of a series of three papers, on dental education, dental literature and dental organizations, to appear in successive issues of The Journal in timely accord with the plans for the centennial celebration, in Baltimore next March, of the establishment of dentistry as a separately organized profession.

editor of the *American Journal of Dental Science* (1839); a founder of the American Society of Dental Surgeons (1840) and its president (1844), and author of the first dental text-book, "The Dental Art—a Practical Treatise on Dental Surgery" (first edition in 1839) and of the first "Dictionary of Dental Science" (1849).

II. GENERAL PROGRESS IN A CENTURY

Dental education, in institutions specially organized to prepare students for the practice of dentistry, was begun in the Baltimore College on November 3, 1840. During the forty years ending in 1880, the number of active dental schools in the United States increased to a total of thirteen. During the next decade, ending in 1890, the number of dental schools increased from thirteen to thirty-four. The maximum number was fifty-seven, in the decade ending in 1900. The number of existing dental schools is thirty-nine. The number of students in the first dental school during its first year was five. The present undergraduate attendance in the dental schools in the United States is 7,428, an average of 190 per school. Before the first school initiated formal institutional education in dentistry, the most effective training for dental practice was obtained by the method of apprenticeship. As recently as 1901, of the 28,142 dentists then in active practice in the United States (and who began in 1840 or thereafter), 16,831 were graduates of dental schools and 11,311 were not. The very few dentists now in active practice in the United States who did not graduate from dental schools, if any, are venerable survivors of a system that was made obsolete by the adoption of the dental practice acts, beginning effectively in 1868.

For twenty-seven years after the initiation of formal institutional education in dentistry, all of the dental schools except the transient one in Transylvania University (1850-1852), like most of those in medicine, were independent and proprietary. In 1867, Harvard University established a dental department in association with its medical department, dentistry for the first time thus attaining a permanent educational status in a university and formal association with a medical school.

All proprietary dental schools have been discontinued or made integral parts of universities. Only five exproprietary schools remain independent, but each has been rechartered as a non-profit philanthropic educational institution and publicly seeks incorporation in a university.

Dentistry continues to be a highly mechanical division of health service, and must so remain until dental disorders can be completely prevented by advisory means, because permanent teeth, performing special mechanical functions and having structure in accord therewith, lack powers of self-repair and self-replacement. But dental practice is being steadily improved by the increasing application of the sciences that are basic for all phases of health service.

Dental education has become a definitely established branch of education in universities, where, in accord with the accreditation of dentistry as a division of health service, the dental schools are being steadily brought into closer practical relationships with the medical schools and hospitals and with other associated departments. These conditions are facilitating not only continual betterment in the coordination of the basic sciences and technical procedures in clinical dentistry, but also the promotion of dental public health development.

In accord with all other types of professional education in universities, the preliminary academic conditions for admission to dental schools have been increased gradually from no formal exaction to the present requirement of graduation from a four-year high school and completion of two years of approved

study in an accredited college of liberal arts. The number of prospective dental students who complete the requirements for the B.A. or B.S. degree is growing. The length of the dental curriculum has been increased from one year of four months to four full academic years.

Equipment and analogous facilities, including libraries, have been increased in dental schools to meet improvements in instruction, although, in most schools, greater resources should be made available for current needs.

The quality and scope of the courses, the efficiency of the curriculum and the effectiveness of the teaching, in most dental schools, have been continually adjusted to the growth of dentistry as an accredited division of health service. In recent years, instruction in the basic sciences for dental students has been improved by more intimate cooperation from the associated medical faculties, and the number of whole-time teachers in dentistry has been increasing, but the salaries are generally inadequate. The number of dental teachers who conduct research is growing and graduate study is being promoted, but the financial support of dental research and graduate work by the respective universities is relatively weak.

Courses for dental hygienists have been increased in number and improved in quality since their initiation in dental schools twenty years ago. The problem of ways and means of coordinating instruction for dental technicians, in dental schools, remains unsolved.

Organizations of dental schools and of dental teachers, regardless of disharmony through long periods, have had a progressive influence on the evolution of dental education. These organizations have been successively the National Association of Dental Faculties (1884-1923), the American Institute of Dental Teachers—successor of the National School of Dental Technics, renamed Institute of Dental Pedagogics—(1893-1923), the Dental Faculties Association of American Universities (1908-1923) and the American Association of Dental Schools (1923—). The last of this group resulted from a voluntary amalgamation, in 1923, of the first three bodies, and of the Canadian Dental Faculties Association. The creation of this important new organization, having advisory function only, unified the administrative and teaching forces in dental education in North America; eliminated all causes of reasonable disagreement among the dental schools except such as are inherent in the real problems of dental education; provided exceptional opportunity for unprejudiced consideration of procedures of administration and methods of teaching; paved the way for the important collaborative study of the dental curriculum (1930-1935), and for the public report thereon (1935); and assured annual recurrence of general meetings devoted exclusively and constructively to the discussion of responsibilities and opportunities in dental education.

For nearly thirty years, the Dental Educational Council of America (1909-1938), consisting of representatives of the dental schools, state boards of dental examiners and organized practitioners, effectively coordinated the educational ideals and judgments of these groups. The Council was particularly influential in restraining and, finally, in removing proprietary influences in dental education. Its successor, the American Dental Association's Council on Dental Education, consisting of representatives of the former groups, is now engaged in an extension of the earlier Council's function, with assured prospects of cumulative success.

On the general effectiveness of dental education, as it has developed in this country, the most expert witness, whose informed observations for seventy years extended as far back as the fifteenth year after the establishment of the first dental school, is Charles W. Eliot. In

1924, when he was president emeritus of Harvard University, Eliot commented, in an address at Harvard, in part as follows[8]:

> I want to congratulate you on the greatly improved standing of the dental profession among the professions. That is one of the most striking changes in public opinion that I have witnessed during my seventy years of observation of educational progress. . . . I do not think I have seen during my seventy years of observation of the professions and the means of training them any change so great as that which has taken place in regard to the dental profession, and to the means of training dentists. . . . The training a dentist needs is in large part a training in skill of eye and hand. It happens that in acquiring the skill he needs [,] he must learn to perform with a high degree of skill a great variety of manual and bodily labor. . . . I believe this School acts on the belief that if a young man cannot acquire the necessary skill of eye and hand, then he cannot become a good dentist. . . . Look forward, therefore, to the future of your profession with great hope.

Dental education, during the fifteen years since Eliot's judgment was published, has been progressing at a greater rate than ever before. As in all other phases of education, opportunities for the further improvement of dental education are abundant, and are clearly recognized in all of the schools. Some of these improvements await solution of many current general problems in education. There is urgent need, in the university dental schools, for a greater share of the attention of the president and trustees to the economic requirements of dental education as an agency for instruction, and for graduate work and research, in a division of health service that now affects the welfare of every person, from early childhood to old age. Dental faculties welcome the close cooperation of educational advisers who are competent to indicate useful developments in dental education. These developments should assure, for the dental student, the most desirable cultural opportunities and also adequate understanding of the social obligations and economic responsibilities of dental practice, without impairment of the training required to give him the ability and readiness to perform faithfully and skilfully all his duties as an intimate personal health servant.

III. Alleged Influence of Derogatory Medical Opinion of Dentistry on the Creation of the First Dental School

From the earliest times, physicians, as a rule, regarding dental disorders as relatively superficial and temporary in their relation to human welfare, have been correspondingly unconcerned about means for the amelioration of dental disabilities. This inattention by physicians occasioned the gradual development, by craftsmen, of interest and proficiency in the mechanical alleviation of dental disabilities. A prolonged trade era of improving craftsmanship, of attendant increasing personnel and of growing acceptability of the ensuing reparative and restorative dental service prepared the way for the evolution in understanding and responsibility that resulted, in 1839-1840, in the establishment of dentistry as a separately organized profession.

Hayden and Harris and their colleagues appreciated the immediate and potential importance for dental practice of the various sciences that were basic for medical practice, and endeavored to increase dental application of these sciences. The founders of the first dental school, who were also proficient in the mechanical arts of dental service, knew that effective application of these arts was the essential factor in the inevitable differences in the respective requirements for medical practice and dental practice. This intimate knowledge of the realities by these eminent dentists, and their reluctant finding that dental education could not be included in medical education without detriment to the required

instruction in the mechanical arts of dental service, led to the decision, by preference, to establish a dental school for independent preparation for dental practice. The legend that this decision was not by preference, but expressed the acceptance of an unwelcome alternative imposed by medical disparagement, has been a dispiriting influence in the dental profession, and a misleading intimation wherever the status of dental education has received special attention. The findings summarized below represent a new study of the conditions from which this legend arose.

The founders of the first dental school were imbued by an earnest aspiration to promote dentistry to its highest attainable proficiency and to raise the status of dental practice to the intellectual, professional and social levels that its best service merited. Before 1818, none of the American schools of medicine, then twenty-five in number, the first of which had been created in 1765, gave formal instruction preparatory for the practice of any phase of dentistry. In 1823, Hayden—who in 1810 had been licensed to practice dentistry in Maryland, in his youth had a short experience as a "school teacher" and in later years was the preceptor of leading dentists—conducted by request a course of lectures in dental physiology and pathology for medical students at the University of Maryland, having previously (in 1818-1819[4] and perhaps in 1821-1822[5]) lectured there on odontology. In giving these lectures, Hayden appeared to be animated by a desire to promote the development of dental education in medical schools, but the outcome of his efforts was not encouraging. His lectures were discontinued in 1825. It seems probable, as some have concluded, that Hayden's experience in these lectures became an important influence in the decision, in which he shared, to establish in Baltimore the first institution devoted directly to instruction for the practice of dentistry.

During the years 1825-1839, a succession of seriously disruptive controversies in the University of Maryland, involving the boards of regents and trustees, terminated in 1839 by a decision of the Court of Appeals, greatly disabled the university and required its reorganization. Throughout this prolonged controversy, "there were constant friction, bickering and infidelity on the part of all. Bitter factions developed and the ground was made ready for any perfidy that the unscrupulous participants saw fit to engage in."[6] It is not surprising that, under the ensuing emotional stresses, misrepresentations multiplied and that some of them acquired the persistence and plausibility of fables. Out of the conglomeration of personal perversities, there emerged a legend of special interest to dentists to the effect that derogatory opinion of dentistry in the medical faculty of the University of Maryland in 1839 caused rejection of a proposal to create a dental department in that university and was a decisive influence for the formation of the first dental school.

Dean J. Ben Robinson, after stating that "no intimate records relating to the founding of the [Baltimore] College [of Dental Surgery] are available and no reference can be found in the minutes of the University of Maryland Medical School to indicate any interest it may have had in the project," and after discussing pertinent circumstantial evidence bearing on the creation of the first dental school, added this comment: "In my opinion no approach was made to either [of the two] medical school[s] at this time [existing in Baltimore] and any belief that the University of Maryland ever rejected it [proposed addition of a dental department] is *confused with the discontinuance of* [*Hayden's*] *lectures in the latter in 1825.*" [Italics not in original.][7]

The legend that derogatory medical opinion about dentistry was a decisive influence in the establishment of the first dental school did not acquire the status

of a public record until it was stated, in 1904, in a paper on the "History of the Baltimore College of Dental Surgery," by a member of the faculty, William Simon, Ph.D., M.D., who wrote in part as follows[8]:

Dr. Eugene F. Cordell *(The Medical Annals of Maryland,* page 105), the acknowledged authority on the medical history of Maryland, speaks thus [1903]: "The founders of the school first endeavored to engraft it upon the university as a separate department of the same. Being unsuccessful in this, doubtless owing to the unsettled condition of the latter, which had shortly before this been rent in twain and was but just emerging from a nearly fatal lawsuit, they boldly launched out upon the untried sea, with an independent school. Their immediate and marked success shows that this effort was opportune and that they supplied a real want."

That both men, Hayden and Harris, worked together* in their efforts to obtain favorable action by the University of Maryland is shown by the fact that the faculty of the university addressed to Dr. Harris the letter rejecting the proposition, giving as an excuse, "that *the subject of dentistry was of little consequence, and thus justified their unfavorable action.*" [Italics not in original.]

The reader should note that the second paragraph of the foregoing quotation was written by Simon. Cordell said nothing about the alleged "letter addressed to Dr. Harris." Simon did not indicate from whom, or how, he obtained information regarding that letter. The concluding portion of the foregoing quoted statement was repeated by Simon in C. R. E. Koch's three volume "History of Dental Surgery" (1910, Vol. I, p. 411). It was also quoted, as an accepted fact, in J. A. Taylor's "History of Dentistry" (1922, pp. 83 and 158)† and in the Carnegie Foundation's "Bulletin on Dental Education" (1926, p. 39), the last of these references having been based directly on Simon's statement in 1904 and its repetition by him in 1910.

The "excuse" quoted by Simon from the alleged "letter addressed to Dr. Harris" was stated in this elaborated form by B. L. Thorpe, also without indication of the source of the information, but probably amplified from Simon's comment (Koch's "History," Vol. III, p. 71):

Dr. Harris . . . conceived the organization of a dental training school as an adjunct to the medical department of the University of Maryland, to whose faculty he made overtures which were however, rejected. *They feared that chartering a college for dentists would prove detrimental to the interests of the medical college,* and strenuously opposed the movement, giving as an *excuse* "that the subject of dentistry was of little consequence, and thus justified their unfavorable action." [Italics not in original.]

Here, the stated reason was assumed to be a mask for the real reason. It is possible that the rejection, in the form stated above by Cordell in his "Medical Annals," was derived mistakenly in part from reports on conditions elsewhere, such as those indicated in the following quotations from biographies by B. L. Thorpe in volume III of Koch's "History":

Dr. Harris went to New York City [year not indicated] and consulted the leading men of the [dental] profession, and with their aid endeavored to establish a chair of dentistry in one of the New York Medical Colleges. Meeting with discouragement . . . he returned to Baltimore [and proceeded with the work of organization of the first dental school.] (Page 71.)

He [Solyman Brown, A.M., D.D., M.D.,

*Simon had previously stated (loc. cit., p. 297): "That Dr. Hayden was the moving spirit in the undertaking may be inferred from the fact that he was made and remained to his death the president of the college."

†In Taylor's "History," this "excuse," as stated on page 83, does not agree with its repetition on page 158, where it is given in this form: "They [*a group of 'prominent men'*] were informed by the medical faculty [University of Maryland] that 'dentistry was of little consequence, *and the University being already overtaxed,* such action could not be taken.'" [Italics not in original.]

D.D.S.] was associated with Hayden, Harris, Parmly and others in establishing a dental chair in a New York City medical college, and the failure to accomplish this [year not indicated] resulted in the organization of the first dental college at Baltimore, 1839. (Page 93.)

In the first quotation above from Simon's paper, Cordell was designated "the acknowledged authority on the medical history of Maryland." Simon did not mention Cordell's earlier "Historical Sketch of the University of Maryland School of Medicine," published in 1891. The following related quotations from page 123 of that earlier volume by Cordell again illustrate the inaccuracy of much that has been written as "dental history":

The University has a connection with the founding of the Baltimore College of Dental Surgery of which few are now aware. This institution was *chartered* in 1839, and the founders first made application to the authorities of the University for admission as a separate department thereof. This being refused, they established an independent dental school, the first, it is claimed, in the world. It cannot but be regretted that their offer was not accepted, as with the facilities at hand a dental department could have been readily engrafted upon the medical. . . . At the time referred to, however, it must be remembered that the University was in an unsettled condition or else just emerging from it. [Italics not in original.]

In a footnote to this comment, Cordell remarked that he was "unable to give his authority for the above statement, not having made a note of it or else having lost the reference, but his impressions are very strong that it occurs in some of the writings of Dr. Chapin A. Harris." In the same footnote, Cordell omitted Harris from the list of members of "the first Faculty of the Baltimore College of Dental Surgery," but added the erroneous comment that "Dr. Chapin A. Harris was very shortly after added to these."

The important significance of the alleged "excuse," to which Simon gave the appearance of truth, imposed upon him the public obligation to make his reference to the "letter addressed to Dr. Harris" directly verifiable, or to indicate, with the candor shown by Cordell in a quotation above, that he did not know where the alleged information originated. In this respect, Simon failed to show the sense of responsibility he manifested in another relationship when, presenting a personal statement about Hayden that required more than a mere affirmation, he included a copy of a dated confirmatory letter which, in a footnote, was said to be "in the archives of the Baltimore College of Dental Surgery."[9] It is difficult to believe that Cordell, "the acknowledged authority on the medical history of Maryland," would have failed, in each of his histories mentioned above (1891, 1903) that were issued before the publication of Simon's paper in 1904, to refer to derogatory opinion in the medical faculty, if that opinion had been as evident or influential as Simon alleged.

Despite Cordell's presumptive knowledge of medical history, his "University of Maryland: 1807-1907," published in two volumes in 1907 (three years after Simon's first paper appeared) gave currency to the alleged influence of derogatory medical opinion, and amplified its significance, in this discordant comment (volume I, p. 383):

They [Hayden and Harris] united in the effort to induce the authorities of the University to add dental instruction to the medical course. Unfortunately this effort was made when the institution was suffering from the effects of the great rupture and the long and blighting law suit to which it gave rise. So that when, on the conclusion of these troubles and the restitution of the institution to the Regents in 1839, a formal proposal for union [sic] was made by Drs. Hayden and Harris it was rejected by the Faculty of Physic. The low condition of dentistry at that time is shown by the letter addressed to Dr. Harris in which justification for the rejection is

sought in the *insignificance of the subject.* Thus was lost [by the university] a great and noble opportunity for usefulness and fame.

Cordell did not quote any part of the alleged "letter addressed to Dr. Harris." In a footnote on the same page, he indicated as follows the source of the influence that led him to present reliantly an indefensible view which had not been included in his previous volumes:

> "History of the Baltimore College of Dental Surgery." By William Simon, Ph.D., M.D., Baltimore, Md., pamphlet, pp. 36, illustrated. Presented to Section IX of the Fourth International Dental Congress, held at St. Louis, Mo., 1904; reprinted from Vol. III of the Transactions [1905]. Doctor Simon is the distinguished Professor of Chemistry in the Baltimore College of Dental Surgery, and *is a thoroughly reliable historian.*" [Italics not in the original.]

The present writer's confidence in Simon's reliability as a historian impaired by the finding that, in directly quoting Cordell a second time, Simon, in his article in Koch's "History" (1910), materially changed the import of a sentence, without indicating a reason for the alteration, and in a way to exclude the possibility that a typographical error accounted for the modification. The difference between the two versions may be seen below:

1. Sentence quoted by Simon in 1904 (page 298) from Cordell's "Medical Annals," in complete agreement with the original:

> Their immediate and marked success *shows that this effort* was opportune and that they supplied a real want. [Italics not in original.]

2. Same sentence quoted by Simon in 1910 (page 411), in disagreement with the original:

> Their immediate and marked success *showed that the movement* was opportune and that they supplied a real want. [Italics not in original.]

This contrast suggests a pertinent question: If an author feels free (or is careless enough) to change the import of an *accredited* quotation, how much freedom (or carelessness) might be exercised in his publication of the significance of a succession of *rumors* about a "letter addressed to Dr. Harris" sixty-five years after the occurrence of the alleged event?

Simon seemed to be unaware of the fact that direct evidence was presented, in this relation, by Harris himself, more than fifty years before the presentation of Simon's paper in 1904. In an editorial on Gardette's suggestion of "the propriety of abolishing dental colleges, and substituting for them a lectureship on dentistry in each of the medical schools," Harris commented, in part, as follows[10]:

> When the first dental college was about going into operation, we were waited on by three members of the faculty of one of our oldest and most respectable medical schools, and tendered such a professorship as is suggested by Dr. Gardette, but we declined it upon the ground that no purely medical institution could afford the necessary facilities for thorough practical instruction in operative and mechanical dentistry, and that, consequently, if we accepted it, we would be employed in making the worst kind of quacks—men without skill, but with acknowledged pretensions to it. [Page 399.]
>
> That medical faculties may be found who will undertake to teach dentistry is possible. There are few things some of them would not *promise* to do and undertake to do, if students could be lured by the novelty. [Page 400.]
>
> The plan suggested by Dr. Gardette is not a novel one. About thirty-five years ago, the late Dr. Hayden, of Baltimore, delivered courses of lectures on dental surgery, in the University of Maryland—the experiment, however, was unsuccessful. [Page 401.]*

*Here, with what seems to have been intended emphasis on the idea of novelty, Harris presumably included Hayden's earliest experiment—lectures on odontology—in 1818-1819, thirty-two or thirty-three years before April 1851.

Harris' reputation as a man of the highest integrity precludes the possibility of deliberate misrepresentation in any of his comment on Gardette's proposal. It is equally improbable that, if the alleged "letter addressed to Dr. Harris" had ever been received, he would have exposed himself, only eleven years after the creation of the first dental school, by such provocative comment as that quoted above, to the public characterization that would naturally have followed from one or more of the many then living physicians who would have known about the "excuse" in that hypothetical letter.

If derogatory opinion of dentistry had been expressed, as alleged, by the Medical Faculty of the University of Maryland, public comment by members of the faculty of the first dental school, during its first year, would probably have shown an emotional reaction to such disparagement. It seems certain that the following comment would not have been published, if derogatory opinion had had the alleged influence:

> Quotation from Dean Harris' "introductory lecture" at the opening of the "first session" [November 3, 1840]: "For the friendly feeling that has been manifested towards it [college] by most of the medical faculty of this city, as well as by gentlemen of that profession in other places, and for the flattering notices that have been taken of it by many of the medical and newspaper presses of the country, they [college faculty] not only feel profoundly grateful, but are stimulated by them, to enter upon its duties, with a zeal, which, perhaps they might not otherwise have possessed."[11]
>
> Quotation from Professor Bond's "valedictory address" to the graduates at the first commencement (March 9, 1841): "We have been encouraged, and cheered on by the countenance and sympathy of the most skilful and distinguished of the [dental] profession on both sides of the Atlantic. To the medical profession, too, we are happy to acknowledge ourselves under great obligations. From the first, they have been our warm and zealous friends. They have despised the fitful jealousy, so often and so falsely attributed to them, and every where and in every way, they have promoted the success of an infant enterprise."[12]

It is very unlikely that the Medical Faculty of the University of Maryland formally announced that dentistry was of little consequence at a time when the organized medical profession of Maryland, of which the Medical Faculty of the University was a part, regarded dentistry as of sufficient consequence to justify the issuance of licenses for dental practice. In 1805, the Maryland State Board of Medical Examiners (elected by the state medical society) was "authorized to grant special licenses to dentists and oculists to practice in their respective branches, subjecting them to an examination only in the branches they possess.[13] Among those to whom licenses to practice dentistry were issued by this board for the Maryland State Medical Society was Hayden[14] in 1810, thirty years before the establishment of the first dental school! These conditions continued in Maryland and prevailed elsewhere.

> In December, 1841, shortly after the opening of the first dental school's second year, Alabama enacted a law [the first dental statute] that nominally restricted dental practitioners in that state to those who were formally adjudged by medical examiners to be qualified. . . . [This statute] provided that applicants for admission to the practice of dentistry should be examined and licensed . . . under the general restrictions that applied to admission to the practice of medicine.[15]

If the alleged proposal, by Hayden and Harris, of the creation of a dental department in the medical school of the University of Maryland had been rejected in 1839 because dentistry was insignificant, only an unbelievable reversal of medical opinion could account for the fact that on March 15, 1840—six weeks after the incorporation of the first dental school—the University of Maryland conferred the honorary M.D. degree upon Hayden, then the chief exemplar of dentistry in

Maryland. The award of this honor to Hayden was noted casually by Cordell in 1903[16] and by Simon in 1904.[17] Why neither of them recognized the significance of this tribute to Baltimore's leading dentist, but gave unconfirmed rumors of the influence of disdain for dentistry the appearance of truth, is wholly conjectural.

If more were needed to show the inherent improbability that alleged medical disparagement of dentistry was an influence in the creation of the first dental school, and that the "excuse" in Simon's "letter addressed to Dr. Harris" was hypothetical, it would be supplied by the first issue of the medical journal founded by the Maryland State Dental Society in 1839 as its quarterly publication and which was named *The Maryland Medical and Surgical Journal, and Official Organ of the Medical Department of the Army and Navy of the United States,* from which the following editorial comment among "bibliographical notices" is quoted (1839-1840, 1:110, October 1839):

The *American Journal of Dental Science* . . . is the title of a new periodical devoted particularly to the interest of our *Brethren* of the *File* and *Forceps*. It has reached its third number; one which has not in the least disappointed the high expectations created by its predecessors. We look upon this undertaking as . . . pregnant with good to the community at large. . . . We commend it to the favorable attention of the medical community, and ask for it an extended patronage. We do this the more cheerfully because of the intimate connexion which exists in reality between this branch of our profession, and *those* to the interests of which *we* are more immediately devoted. . . . We would particularly call their ["our *Brethren* of the *File* and *Forceps* . . . dental surgeons"] attention to an immediate effort either to establish schools of dental surgery in this country, or attach chairs devoted to this branch of a medical education, to the different colleges already in existence. Although many difficulties would necessarily be encountered in carrying into successful operation either of these suggestions, we nevertheless believe that one or the other of them could be fully carried out, to the great benefit of both professions, and the people generally. Let the members of these kindred professions but see, eye to eye, and unite diligently in the determination to exalt the standard of education in both departments of their work, and we confidently predict that the time will soon come, when the public will *know it* (and act accordingly,) to be most to their interest to commit their health and lives into other hands, than those of individuals whom they would not trust to mend a pair of shoes, or patch a pair of breeches." [Italics and punctuation as in the original.]

The foregoing allusions to "Brethren," to dentistry as a "branch" of medicine, to the desirability of establishing dental schools or dental chairs in medical schools and to the public benefits that would accrue from coordinated efforts "of these kindred professions" to improve the "standard of education in both departments" are convicing indications that, contrary to the allegation by Simon sixty-five years later, the endeavors of Hayden and Harris to advance dental education were not regarded disdainfully by the medical profession in Maryland. Immediately following the "bibliographical notice" from which the last quotation was taken is this significant editorial comment (page 111):

The Dental Art—a Practical Treatise on Dental Surgery. By Chapin A. Harris, M.D., Surgeon Dentist. Baltimore, Armstrong and Berry, 1839—pp. 384.

The above is the title of a most excellent work . . . in every respect creditable to the talents of its author, and well calculated to be useful to the dental surgeon and student. It contains a fund of interesting matter, apparently the result of long experience and careful observation. We sincerely trust it will meet with an extensive circulation.

This cordially approbative comment does not imply that, in 1839, dentistry was regarded by Baltimore physicians as "a subject of little consequence."

SUMMARY OF FINDINGS IN THE CONCLUDING SECTION OF THIS PAPER

In 1904 and again in 1910, William Simon, Ph.D., M.D., a member of the Faculty of the Baltimore College of Dental Surgery, stated, seemingly from "inside information," that in 1839 an appeal to the Medical Faculty of the University of Maryland, by Hayden and Harris, for the creation of a dental department in that medical school was rejected, the "excuse" in a "letter addressed to Dr. Harris" being "that the subject of dentistry was of little consequence, and thus justified their unfavorable action."

This statement of derogatory medical opinion as a factor in the creation of the first dental school, published by Simon sixty-five years after the reputed expression of this opinion, has been repeated by many authors, but has never been supported by any direct evidence such as a copy of the alleged "letter addressed to Dr. Harris" or related minutes of the Medical Faculty would have afforded. Diligent search for a record of that letter, previous to Simon's reference to it in 1904, has been unsuccessful.

Numerous records indicative of medical opinion regarding dentistry, from which a few quotations have been assembled in the present paper, afford convincing circumstantial evidence to the effect not only that medical hostility such as Simon alleged did not occur influentially in the University of Maryland in 1839, but also that dentistry was then regarded by the organized medical profession of Maryland as a "branch" of medicine—as *"a kindred profession."*

The available pertinent facts indicate that the letter of rejection, which according to Simon the medical faculty of the University of Maryland "addressed to Dr. Harris," was an artefact in dental history. How this artefact occurred remains to be discovered.

The first dental school was created, by preference and not as an unwelcome alternative, in accordance with the matured judgment of its founders that dental education could be promoted most effectively in colleges established to advance it.

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A THIRD SET OF TEETH?

By George B. Winter, D.D.S., St. Louis, Mo.

Case 1.—*History.*—Mr. G. M., a farmer, aged 50 years, white, an American (parents born in America), height, 5 feet 2 inches, weight, 130 pounds, married and the father of four children, gave a history of deciduous teeth erupting and exfoliating at apparently the normal time. All the permanent teeth in both arches erupted at what were seemingly, to him, irregular intervals. He first consulted a dentist at the age of 20 years, because of great discomfort and pain in the teeth. Between the ages of 20 and 21, all of the teeth in the maxillary arch were removed, as well as all teeth in the mandibular arch, with the exception of the right first molar, left second molar and left lateral incisor. Several months after their removal, a full upper vulcanite denture and a partial lower vulcanite denture were placed in the mouth. The same upper denture was worn from that time until he presented himself for examination, about thirty years later. He still had the lower denture, which he had worn very little for several years. He had had a severe rheumatic and neuralgic condition for several years, with a dull ache and, at times, a severe pain throughout both jaws. A deficiency of the hearing had been gradually growing worse for several years.

Fig. 1.—Plaster cast of maxillary arch.

Clinical Examination.—Examination of the maxillary arch revealed a large, wide ridge, with thick heavy gum tissue. A small portion of the cusps of eleven or twelve teeth showed through the soft tissues. In the mandibular arch, there were the right first molar and left second molar, in normal position and of normal size and formation; and the left lateral incisor, of normal size with a decided distal inclination. The same heavy ridge and gum tissue as characterized the maxillary arch were present.

Fig. 2.—Plaster cast of mandibular arch.

Roentgenographic Examination.—Examination of the maxillary arch revealed approximately twenty-five or twenty-six teeth of various sizes and forms and in various positions. Some were apparently fully developed and of normal proportions, while others appeared as only supernumerary teeth and were very irregular as to proportions.

The mandibular arch showed the same conditions, with seemingly twenty or twenty-five teeth. The mandibular left third molar was completely impacted in a mesio-angular position. In the right molar region, there were a normally developed second and a third molar, both completely impacted.

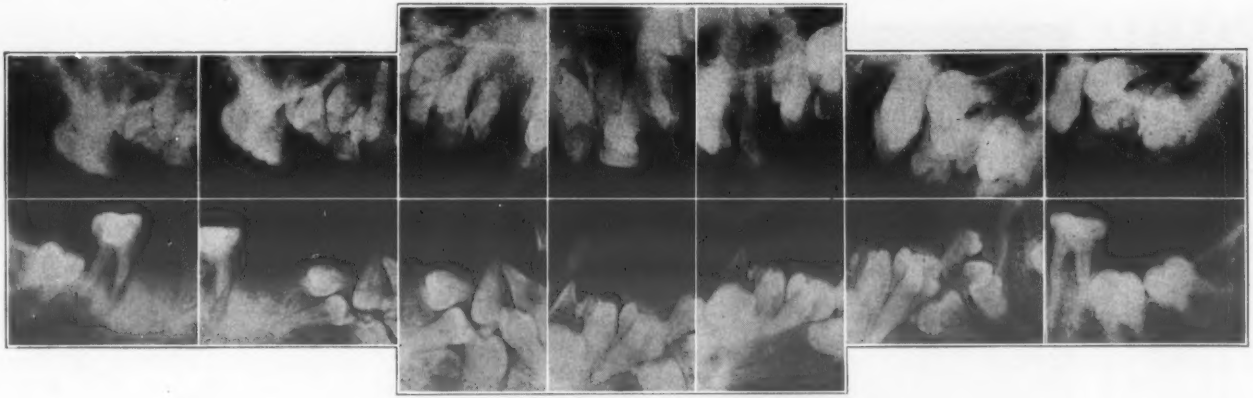

Fig. 3.—Maxillary and mandibular roentgenograms.

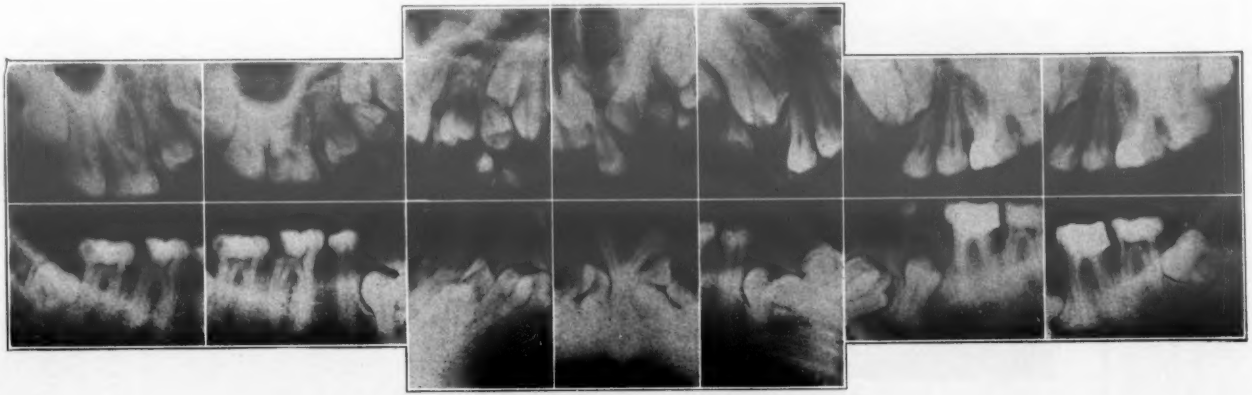

Fig. 4.—Maxillary and mandibular roentgenograms of son. (Case 2.)

Operation; Results.—Under local anesthesia, all teeth showing any protrusion through the tissue were removed, as well as additional teeth which were completely embedded. The patient returned home and reported three months later. He had no postoperative reaction and he showed a marked improvement in the general physical condition, especially as to pain in the dental arches, and a slight improvement in hearing. Six months later (nine months after the removal), on a request that he return for a check-up, he stated that improvement was such that he would not return unless his condition grew worse.

Fig. 5.—Plaster cast after teeth protruding through gum tissue had been removed and replaced in impressions.

Case 2.—A son of the patient, aged 25, who was not interested in his or his father's case and was very adverse to having a clinical or roentgenographic examination, had apparently normal molars with the exception of an impaction of the third molars in both arches. The maxillary arch showed numerous abnormally formed and also supernumerary teeth in the bicuspid and anterior regions. The mandibular arch showed a similar condition, especially in the left bicuspid region. Owing to this patient's lack of interest, it was impossible to get more detailed roentgenograms.

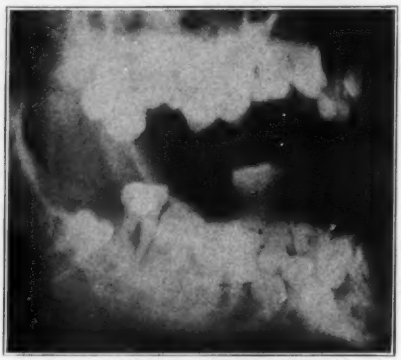

Fig. 6.—X-ray appearance of arches.

Frisco Building.

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JANUARY *Editorial Department* 1940

THE SEARCH FOR THE ETIOLOGY OF DENTAL CARIES

WHEN W. D. Miller, in 1882, announced the chemicoparasitic theory of the origin of dental caries, it was generally accepted as the solution of the problem, and while it did account for the principal factors in the end-result, the parts which many other contributory factors played in the initiatory process remained, and still remain, obscure.

Black's subsequent findings regarding the bacterial plaque supported Miller's theory, accounted for one of the important factors in the end-result and helped to establish what is undoubtedly the main factor in the cause of caries, namely, the mucinous plaque, which affords protection to the fermentative processes that favor the growth of the lactobacillus organisms, which, in turn, initiate the decalcification of the surface enamel and afford entrance of the bacteria to the inner structures of the tooth. Other factors preceding the formation of the plaque and the production of the lactobacillus organisms not only remain unexplained, but also have apparently continued to increase with the further study of the question, until today it has become

a broad biologic problem and appears to be as far from solution as ever.

In the meantime, extensive and continuous efforts, mostly individual, have been directed toward proving or disproving Miller's theory, and to the study of other and newly revealed factors, but there apparently had been no effort to correlate the work. As a consequence, innumerable personal theories were presented, until the entire effort resolved itself into a veritable bedlam of confirmatory and contradictory confusion of theories, and this confusion was being further confounded until the inauguration of the effort by the Research Commission to correlate and coordinate these various ideas and theories of the causation of dental caries.

The Commission on Research was organized by the Association for the purpose of promoting scientific study of the numerous problems in dentistry, and because the trend of thought in dental circles at that time was mainly toward the perfection of the mechanical procedures in dental practice, the efforts of the Commission were directed largely to the study of the materials concerned in the development of mechanical perfection, to the neglect of the biologic aspects of dental practice. Some years ago, however, with the slow but sure evolution of the biologic conception of dentistry, the Commission on Research conceived the idea that it could effectively serve the profession by directing its efforts toward the study of the biologic relations of dentistry as a public health service. And from this modern conception of the biologic relations of the mouth and teeth as important factors in the development, maturation and health of the body came the idea of collecting, condensing and correlating all the research work done on dental caries, an effort which has culminated in the publication of the "Dental Caries" monograph just issued by the Research Commission.

To one who is in any sense familiar with the enormous amount of work involved in the collection of the various views, as well as the correlation of these views, not to mention the task of condensing the material to such form and proportions as to make it readable and understandable by the average dentist, it is at once apparent that the effort thus necessitated would be discouraging to any but the stoutest heart.

That the task has been well done is apparent to any one who reads even sketchily the monograph under discussion. The unstinted thanks of the profession are due the Research Commission and particularly its committee which performed the enormous work involved in compiling the monograph. The work of condensing the material, and analyzing and presenting it in succinct form was most capably done by

William J. Gies, to whom the profession should be and is grateful for the accomplishment of a task that could be successfully pursued by but few.

In this issue, we are presenting a review and evaluation of the various views on the etiology of dental caries, as presented in the monograph on dental caries, by J. L. T. Appleton, whose capability for such a task is amply demonstrated in the review here presented.

While it is exceedingly difficult to estimate the influence which the work under consideration may exert upon the future course of investigation, we are hopeful that a study and understanding of the enormous amount of research work compiled and interpreted in the monograph will lead to the solution of the most pressing problem now before the dental profession and one that must be solved before we can hope to control this universal and intractable disease that plagues the human race.

THE GREATER NEW YORK DENTAL MEETING

THE Greater New York Dental Meeting held every year in New York City in December has become an established institution for education in dentistry and this year has established another record for interest indicating the eagerness with which the profession embraces every opportunity for educational advancement.

In the developmental stage of dentistry as a specialty of the healing art, the society became one of the most important means of the dissemination of dental knowledge, and the Greater New York Dental Meeting has again revived that educational effort in dental practice; and so the theme or motive of this great meeting has become the intensive development of the clinical aspect of dental practice as a means of keeping its members abreast of the latest, improved methods of dental practice.

The Greater New York Dental Meeting has also devoted special attention and effort toward the cultivation of closer relations between medical and dental practice. In one full day of the program, a series of meetings emphasized the interrelationship of medical and dental practice, and the medical men of New York particularly have taken a most enthusiastic interest in helping to cultivate this mutually helpful and salutary relationship.

It is through an elaborate system of study class work that the society serves its objective most conspicuously. Practically all phases of dental practice are included in the study class program, and all of the classes are oversubscribed each year. The talent engaged by the management of the society and the enthusiastic interest maintained in the sessions testify to the great amount of postgraduate educational pabulum that is being dispensed each year.

Another elaboration of the same educational motive is the many topic discussions held during the meeting. The topic discussions, conducted by the leading practitioners the country over, furnish a source of education on the latest modes of dental procedure, which, together with the study class phase, characterizes this meeting as one of the most intensive and authoritative sources of education in dentistry.

Under the direction of these topic leaders in the various discussions, many important points were brought to light and those in attendance were encouraged to ask questions on doubtful points. Thus directed, many interesting discussions were brought out that proved enlightening to the audiences.

The social features of the meeting—the alumni luncheon, Jamboree Night, the president's reception—and the historical and educational exhibits offered diversion to relieve the stress of a very intensive study program.

The manufacturers' exhibit was exceptional in scope, in the number of new materials and methods and in the attendance.

The registration this year, 15,533, was even larger than last and marks a new high in enthusiastic attendance at dental meetings.

To the officers of the Greater New York Dental Meeting, C. M. McNeely, chairman; Waldo H. Mork, advisory chairman; Percy T. Phillips, vice chairman, and Walter A. Quinn, secretary-treasurer, the dentists of the metropolitan district and all who attend the meetings owe a debt of gratitude for an unusual opportunity to improve their knowledge of dental practice under most favorable conditions.

BIBLIOGRAPHICAL

Dental Caries

Findings and Conclusions on Its Causes and Control.

Stated in 195 summaries by observers and investigators in twenty-five countries. Compiled for the Research Commission of the American Dental Association by the Advisory Committee on Research in Dental Caries: Daniel F. Lynch, Chairman; Charles F. Kettering, Counselor; William J. Gies, Secretary; New York, 1939. 188 pages. Price $1. May be ordered through Daniel F. Lynch, 2651 Sixteenth St., Washington, D. C.

This book is a successful attempt "to summarize the findings and conclusions of the leading active observers and investigators in all parts of the world, in brief and direct statements of their reviews on caries, as restated by themselves—and representing in their own words the conclusions which, in their judgment, are the enduring results of their efforts and experiences." The committee responsible deserves the highest commendation. Dr. Lynch, secretary of the American Dental Association Research Commission, and Dr. Gies are so well known to the dental profession that comment upon them would be superfluous. A noteworthy departure from committees dealing with technical matters was the inclusion of Mr. C. F. Kettering, well known as an engineer and industrial manager. The inclusion of a layman of such ability brings a freshness of viewpoint from one well trained in scientific method and gifted with exceptional organizing ability.

The major part of the book consists of summaries of views of many workers, ranging alphabetically, literally, from A to Z. These views are not documented by detailed data (nor was this the intention of the volume), but at the end of most or all of the summaries are references to original sources where the supporting data may be found. Much, of course, is included that seems fanciful, but the Advisory Committee is responsible for none of the views offered and apparently used editorial censorship with great restraint (which is as it should be). These summaries illustrate vividly the complexity and difficulty of the subject and the vast amount of attention which has been given to it.

The reader is advised by all means to read the preface (p. 7) and the general analysis (p. 173). From the general analysis, he can refer back at will to the individual summaries for fuller statement or discussion of a particular point. The general analysis is an admirable summary of the *status praesens* of the problem of dental caries. It makes explicit at least some of the gaps in our knowledge that have to be filled, and doubtless it contains clues to valuable investigations in the future. The ground covered in the general analysis is given in the following outline.

I. Introduction.

II. General nature and conditions of caries.

III. Caries in primitive peoples.

IV. Exciting (direct, attacking) causes of caries.

V. Local conditions in caries.

1. Saliva.
2. Oral bacteria.
3. Enamel.
   a. Not a "vital" tissue.
   b. Remineralization.
   c. Mottled enamel.
   d. Fluorine.
4. Tooth resistance to caries.

VI. Systemic conditions in caries.

1. General.
2. Blood relationships.
3. Endocrine glands.
4. Heredity.
5. Nutrition.
   a. Diet in general.
   b. Refined foods.
   c. Sugars.
6. Pregnancy.

VII. Additional stated causes of caries.

VIII. Prevention (arrest, control) of caries.

The typography and format are excellent. In all respects, this volume is an outstanding example of voluntary cooperation and every one having even the slightest professional interest in dentistry should own this book and familiarize himself with the general analysis and keep it by him for reference. The Research Commission, the Advisory Committee and the dental profession are to be congratulated.

J. L. T. Appleton.

Partial Dentures. A System of Functional Restoration

By Ferdinand G. Neurohr, D.D.S., Attending Prosthodontist at the New York Polyclinic Medical School and Hospital; Special Lecturer in Partial Denture Prosthesis at Columbia University School of Dentistry. Cloth. 244 pages. 206 engravings. Price $6.50. Philadelphia: Lea & Febiger, 1939.

In reading this book, one is impressed by the quality of detail and the simple directness of manner in its presentation. Neurohr has developed a specialized attachment for removable partial dentures which he calls "the spring wire lock system of attachment," and his book is a systematic explanation of the many possibilities of this attachment in the construction of partial dentures. The work apparently is not intended as a textbook for use in teaching undergraduate courses. It is devoted entirely to the application of the spring wire and insertion pinlock bridge, which was patented in 1930. It has been given to the profession to be used by any one who wishes to apply it, and may be utilized by any dentist or laboratory, or any dental manufacturer who supplies the dentist.

In the past, it has often, if not usually, been the custom of those who have patented these special attachments to make it necessary for laboratories or practitioners who wish to employ them to take either a special course of training or obtain special permission before being qualified to construct cases which use the patented product. The author, therefore, has simplified the utilization of his product, since he has eliminated the necessity of obtaining his permission to use his product.

A textbook for teaching undergraduate courses in removable partial denture construction should deal primarily and almost exclusively with theory and principle, to the exclusion of detailed technical procedure. A detail of various types of technical procedure can be taught best by a laboratory manual based on general application of principle and theory, rather than on specialized systems and attachments. Therefore, this work has its greatest value as a technical work for practitioners and technicians, and might well be utilized as a background for postgraduate courses.

The book is well-written and profusely and beautifully illustrated. It will be a most welcome addition to the libraries of those who have seen demonstrations of the spring wire lock attachment and who have followed the publication of some of the articles on the device, which have created much interest in the profession.

The Dentist Faces His Future.

By George Wood Clapp, D.D.S. Published by The Educational Division of The Dentists' Supply Company of New York. Price $1.

In a very practical analytic study of the problems of dental practice and a consideration of the psychologic application of extrinsic influences and factors involved in conducting a successful practice, Dr. Clapp has made an intensive study of the methods of practice that lead to success, and his advice to those who are indifferently successful and to those who are admittedly unsuccessful, if applied with anything like the sincerity and enthusiasm of the author in presenting them, will inevitably lead to a larger degree of success in any practice.

This book can be of particular helpfulness to the young graduate in, as the author expresses it, living out as many as possible of the happy dreams with which he begins practice.

Guidance toward success is indeed a laudable ambition for any book or author, and Dr. Clapp has set forth, in a practical and understandable manner, the principles that should form an important part of the mental equipment for successful dental practice.

COUNCIL ON DENTAL THERAPEUTICS

GARDINIER SEDATIVE CEMENT—NOT ACCEPTABLE FOR A.D.R.

Report of the Council on Dental Therapeutics of the American Dental Association, authorized for publication.

THE Council's report on Gardinier Sedative Cement was submitted to the firm. In the correspondence which followed, between the Council and The Dental Specialty Company, the firm acknowledged the justification for portions of the Council's report and offered to amend the advertising of Gardinier Sedative Cement accordingly. The company further indicated its own intention of increasing the iodine content of its product to a point where this element could be detected by chemical means. It appeared unwilling, however, to cooperate completely with the dental profession by submission of its product according to Council rules, including the declaration of qualitative and quantitative composition.

Because of its obligation to the dental profession, the public and manufacturers, the Council does not feel justfied in undertaking a program of partial cooperation with the Dental Specialty Company. The Council's original report is therefore presented for the information of the dental profession, with the hope that the firm may see fit to cooperate more fully with the dental profession in the marketing of Gardinier Sedative Cement.

The Council has received a sufficient number of inquiries to warrant a report on Gardinier Sedative Cement, promoted by the Dental Specialty Company, Denver, Colo.

According to "Instructions for the use of Gardinier Sedative Cement"

Gardinier is not made by any patented process or secret formula. It has been in use in thousands of dental offices for more than thirty years! In fact, its reliability has led to many imitators who while they have copied its well known contents, in general, have failed to compound proportions necessary to duplicate Gardinier's results.

Apparently the formula is secret or essential details of the formula are secret.

Advertising literature of the firm contains the following:

The liquid contains eugenol, thymol and iodine. The powder contains oxide of zinc and subnitrate of bismuth. We believe that those additional ingredients in the proportions used and scientifically compounded, add antiseptic qualities and the desirable properties of stimulation to normal cell function and quicker setting than is the case with the straight eugenol and oxide of zinc endorsed and recommended by the Council of Dental Therapeutics of the American Dental Association.

The statement of composition given above is indefinite. Moreover, free iodine was not found. The phrase "straight eugenol and oxide of zinc endorsed and recommended by the Council of Dental Therapeutics of the American Dental Association" does not represent the Council's stand on "straight eugenol and oxide of zinc" or on any other product acceptable to the Council. The Council has repeatedly stated that acceptance of a product does not imply a recommendation.

While the firm states that "Gardinier is not sold in any sense as a 'cure-all,'" it is recommended by the firm as an excellent material for capping pulps, for a protective base under all fillings, for a pyorrhea pack, for a dry socket pack and for toothache. Several "additional uses" are suggested. Apparently, Gardinier Sedative Cement only approximates the "cure-all" status.

The advertising folder contains, among other things, the following statement:

While it is not our intention to enter into operative controversy, many dentists remove all decay, even though an exposed pulp results, as with Gardinier it is possible to safely cap all such exposures.

As far as the Council is aware, the claim that "it is possible to safely cap all such exposures" is not substantiated by scientific evidence, nor is there, as far as the Council is aware, any material and/or method with which it is possible to "safely cap all such exposures."

Even though "toothache from an exposed or congested pulp can be stopped almost instantly by placing a pellet of cotton, saturated with Gardinier liquid, in contact with the exposed pulp," there is no evidence that it is superior to eugenol U.S.P. in this respect. Apparently, Gardinier liquid is essentially eugenol, although the price might not indicate this.

REPORT OF THE BUREAU OF CHEMISTRY

Three original packages of Gardinier Sedative Cement purchased on the open market were submitted to analysis. The price was $1.80 a package.

Each package consisted of a small rectangular cellophane-wrapped carton holding two bottles of powder and one of liquid. The powder in one bottle weighed 5.1 gm. and that in the other weighed 4.8 gm. The weight of the liquid was 6.5 gm.

The labels on the original packages bore the following:

VALUES FOR SETTING TIME

Powder	Room Temperature F.	Relative Humidity Per Cent	Slab Temperature F.	Set (Min.)
Gardinier*	76	74	73	4½
Gardinier	76	70	73	7
Synthetic	73	69	74	6¾
Synthetic	77	70	72.5	5
Synthetic*	76	74	73	3½
Synthetic	73	74	73	4½

*This sample of powder had been held in an incubator at 98.6°F. for two weeks.

Gardinier Sedative Cement and Pulp Protector
Manufactured by The Dental Specialty Co., Denver, Colo.

Qualitative examination of the liquid indicated the presence of eugenol. Free iodine was not found.

Quantitative examination of the liquid yielded the following:

Refractive Index N_D^{20}	1.540
Distillation range	247-249°C.
Density	1.055

These values correspond to those for eugenol U.S.P.

Qualitative examination of the powder indicated the presence of zinc and bismuth. Other cations were not found. Tests indicated the presence of nitrate. Other anions were not found.

Quantitative examination of the powder yielded the following:

Ash	98.87 per cent
Zinc	76.62 per cent
Bismuth	1.50 per cent

A paste made by mixing 0.5 gm. of Gardinier Sedative Cement Powder with 0.1 ml. of Gardinier liquid set at the same rate, within limits of experimental error, as a paste made by mixing 0.5 gm. of Gardinier Powder with 0.1 ml. of eugenol. It was therefore concluded that Gardinier Liquid contains no acceleratior (a substance which is added for the purpose of hastening the setting process).

From the analysis, it might be concluded that a product essentially similar to Gardinier Sedative Cement could be made up as follows: For the liquid portion, eugenol U.S.P., and for the powder, 96 parts zinc oxide and 2.5 parts bismuth subnitrate ($BiONO_3.H_2O$). A powder of this composition was made into a paste with eugenol. The paste required more than twenty-four hours to "set." A paste made by mixing Gardinier Sedative Cement Powder with eugenol in the same proportions set within a few minutes. It was, therefore, concluded that Gardinier Powder contains an accelerator.

Experimental work conducted in the Bureau of Chemistry shows that many salts will, when added to zinc oxide, decrease the setting time of pastes made by mixing the resultant powder with eugenol. Zinc acetate, bismuth nitrate, zinc benzoate and zinc nitrate were found to act in this manner.

A series of trial batches of cement powder were made in order to determine the simplest formula which would simulate the properties of Gardinier Powder from the standpoint of setting time, ease of mixing and gross physical properties of the finished cement. The following composition was chosen as the most satisfactory:

Zinc oxide	99.8 gm.
Zinc acetate powder ($[CH_3CO_2]_2Zn.2H_2O$ ground to pass a 100 mesh screen)	0.2 gm.

The accompanying table gives values for setting time of the synthetic composition the formula for which is given immediately above, and of a Gardinier Powder sample.

In each case, 0.5 gm. of powder was mixed on a glass slab with 0.1 ml. of eugenol U.S.P. A nickel-plated spatula was used. The mixes produced were quite stiff. The setting time is longer when a thinner mix is made. The mix was considered to have set when it became waxy and brittle. (End of Chemist's report.)

Since the composition of Gardinier Sedative Cement is semisecret, and since unwarranted therapeutic claims are made for it, the Council finds this product not acceptable for A. D. R.

A copy of the rules that govern the Council in the consideration of articles will be sent on request.

HAROLD L. HANSEN, *Secretary.*

President's Message

"WHAT IS THE AMERICAN DENTAL ASSOCIATION DOING FOR ME?"

WHAT is the American Dental Association doing for me? This is a question I sometimes hear, and always with the implication that the questioner feels he is not receiving an adequate return for the $4 which represents his annual dues to the Association.

Inasmuch as the rank and file of our members are not in regular attendance at the annual meetings of the American Dental Association, and, in consequence, have only a hazy idea of the multitude of ways in which it serves the profession, this is, perhaps, a natural question and one which deserves an informative answer. And it can be answered so as to leave no doubt in the mind of any one familiar with the facts that the American Dental Association is rendering an invaluable service to every individual member—a service which no organization except a national one could possibly perform. It alone, of all our dental organizations, is the representative of American dentistry, the only group that can speak with authority.

It is impossible in a brief space to enumerate all the activities in which it is engaged or to give an adequate idea of the time and labor given to it by the officers and committees, often at no little sacrifice to themselves, and always in the interest of the profession.

Among these activities, and one of first importance, is the Bureau of Public Relations. This is ably conducted by Lon W. Morrey, whose duty it is (among other things) to educate the public in all matters pertaining to dental health, with benefit to both the public and the profession. This is an activity of the utmost importance to all concerned. To it, Dr. Morrey gives all his time, and he is performing a task for which he is exceedingly well fitted.

There is also the Research Commission, under the auspices of the American Dental Association and working with the Bureau of Standards in Washington, year in and year out studying materials used in the practice of dentistry. This includes such items as cements, alloys, metals, denture bases, inlay waxes and impression compounds. The results of these researches are published from time to time in THE JOURNAL and thus are made available to all. (See THE JOURNAL for July 1939, page 1197, for a list of certified materials.) These studies make it possible for any dentist, anywhere, to use products

that have been tested and proved to be reliable. This adds greatly to the efficiency and permanency of the service rendered by the dental profession.

The Council on Dental Therapeutics is another all-year-round group, made up of dentists, physicians and chemists who examine and pass upon the reliability of all drugs, anesthetics, dentifrices, mouthwashes and the like used or prescribed by the dental profession. In addition to reporting its findings in THE JOURNAL, the Council publishes each year, at a nominal cost, a small volume called Accepted Dental Remedies. The work it is doing is of inestimable value to both the profession and the public.

In addition to these activities, which of themselves repay one over and over again for the small amount expended for dues, the Association maintains a committee on legislation which keeps in touch with the legislative activities of the federal government and the forty-eight states, with a view to preventing the enactment of unwise dental laws; an economics committee, representing the thirteen Trustee districts of the country; a national health program committee, which acts as the contact committee between the profession and the federal government, a committee that has rendered, and is rendering, invaluable service in cooperating with the government in matters of public health. And there are other agencies such as the Insurance Committee, the Library Bureau, the Relief Commission, all maintained in the interest of the profession and the public at a cost to the membership of about 6 cents each.

And lastly there is THE JOURNAL, the largest and most influential dental periodical in the world, having a circulation of more than 50,000 copies a month. It finds its way into eighty-two foreign countries and is read wherever dentistry is practiced. A subscription to THE JOURNAL is included in the $4 dues.

This is only a partial list of the things which the American Dental Association is doing for the profession and of which every member is a direct beneficiary. It presents a fine record of achievement, one in which every member may well take pride. It needs only your help and mine in order to greatly increase these accomplishments. Should we not, therefore, in our own interest and in the interest of the profession of which we are a part, give it our wholehearted support in the effort it is making to do for us collectively what we could not possibly do for ourselves as individuals?

Arthur H. Merritt

ASSOCIATION ACTIVITIES

THE NATIONAL HEALTH PROGRAM COMMITTEE

THE present status of legislation leading toward a national health program was the main subject of a meeting of the National Health Program Committee which was held in Chicago December 2 and 3. The entire personnel of the committee was present for the two-day meeting: C. Willard Camalier, Washington, D. C., L. T. Hunt, Lincoln, Nebr., Leroy M. S. Miner, Boston, Mass., Raymond M. Walls, Bethlehem, Pa., Harold Hillenbrand, secretary, Chicago, and Harold W. Oppice, chairman, Chicago. Present in an advisory capacity were Harry B. Pinney, Secretary of the American Dental Association, L. Pierce Anthony, Editor of THE JOURNAL, Lon W. Morrey, director of the Bureau of Public Relations, and Samuel R. Lewis, secretary of the Committee on Legislation.

CONGRESS ASSEMBLES ON JANUARY 3

The new Congress of the 76th Session will assemble in Washington January 3, 1940. Most informed commentators are in agreement that legislation for a national health program has been listed among the first activities of the Congress. It is also very likely that major activity will center around one of the three bills introduced during the first session of this Congress: the Wagner Health Bill, the Lodge Bill and the Capper Bill. For various reasons, it is thought that the Lodge and Capper bills will not have an important influence on national health program legislation.

The Wagner Health Bill, officially known as S. 1620 or the National Health Act of 1939, was introduced February 28, 1939, by Senator Robert F. Wagner, of New York. It was referred to a subcommittee of the Senate Committee on Education and Labor of which Senator James E. Murray, of Montana, is chairman. After extended hearings on the bill in which the National Health Program Committee participated, the Senate subcommittee issued a preliminary report, in which the following sentences are significant.

The committee is convinced that Federal legislation along the general lines followed by S. 1620, based upon Federal-State cooperative programs, is necessary to strengthen the health services of the Nation and to make provision for the progressive and effective improvement of health conditions in all parts of the country and among all groups of people. The needs are large and an adequate program to put knowledge and skill more effectively to work will involve considerable expenditure of funds. The program must therefore be worked out with great care. We are confident that such a program can be worked out and that the expenditures will be sound national investments which will bring large returns. The rôle of the Federal Government should be primarily to give technical and financial aid to the States.

A critical analysis of the present provisions of S. 1620 shows a number of points at which its specific purposes can be more clearly stated and its provisions improved. The committee has not yet reached any conclusions concerning the precise rate at which Federal appropriations should be increased, but the committee is agreed on the general principle that the proportion of Federal assistance should be greater to those States in which there is the greatest need for services contemplated under the bill. The committee is prepared to augment the provisions of the bill—if additional provisions are needed—

to assure that the amount of Federal assistance would in no instance be in excess of clearly demonstrated need.

Some misunderstanding seems to have arisen and criticisms have been expressed concerning parts of the bill. Some witnesses have assumed that it would bring about revolutionary or dangerous changes in medical care. We think these fears are unwarranted, but we will welcome further suggestions as to specific amendments which may safeguard the objectives of the bill. Medical science has reached a commendable status in this country. The bill should encourage the further evolutionary development of medical science, teaching and practice.

The committee has received the assurances of many lay and professional groups that they will be prepared to furnish further information and suggestions. We expect to consult further with representatives of these groups.

We have not yet had adequate time to make exhaustive study of all of the problems involved in the legislation proposed by S. 1620. The committee will continue its study of S. 1620 so that a definite report on the proposed legislation can be submitted soon after the beginning of the next session of Congress.[1]

In view of this report, it is probable that an amended Wagner Health Bill will be considered early in the session. The extent and text of these revisions are not known at the present time. The National Health Program Committee is making preparations to present the views of the American Dental Association when or if such action seems either desirable or necessary.

THE AMERICAN MEDICAL ASSOCIATION'S PROPOSALS

The American Medical Association has recently given further definition to its views on the formulation of any national health program. These principles have been incorporated into an eight point platform which follows.

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.

2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.

3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.

4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.

5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.

6. In the extension of medical services to all people, the utmost utilization of qualified medical and hospital facilities already established.

7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and increase their availability.

8. Expansion of public health and medical services consistent with the American system of democracy.[2]

The coming months will undoubtedly reveal new elements in the campaign for a national health program. The major health service professions have outlined the directions in which such advances can be made most beneficially. It remains for Congress to incorporate such principles and safeguards into any program that is translated into legislation. On the extent to which this is done depends a considerable portion of the success or failure of any program designed to meet the needs of the American people.

BIBLIOGRAPHY

1. Establishing a National Health Program. Preliminary report to accompany S. 1620. Report No. 1139, July 31, 1939. U. S. Government Printing Office, Washington, D. C.

2. The Platform of the American Medical Association, *J.A.M.A.*, 113:1966, November 25, 1939.

ABSTRACT FROM THE REPORT OF THE SECRETARY ON SOME OF THE ACTIVITIES OF THE ASSOCIATION DURING THE YEAR PAST

MEMBERSHIP

DECEMBER 31, 1938, the total paid membership for 1938 was 43,179, exceeding the 1937 membership at the same date by 1,080. Since December 31, 1938, 396 have paid back dues; which brings the total paid membership for 1938 to 43,575. The total membership of the American Dental Association for 1938, all types, was 45,729. May 31, 1939, the total paid membership was 41,168, which is 2,301 in excess of the membership as of May 31, 1938.

Junior membership on May 31 was 2,191, 258 in excess of the membership at the same time last year.

The total membership on May 31, 1939, all types, was 43,449.

The Membership Committee, the state society officers and state membership committees deserve much credit for this fine showing. The American Dental Association Membership Plan continues to show excellent results and to demonstrate its value to the forty-one states that have approved it.

Without the cooperation of the deans, members of the faculties and state boards of dental examiners, this plan would be of little service, and we express our appreciation for the service rendered by these bodies.

CHRISTMAS SEALS

The amount subscribed to the Relief Fund through the sale of Christmas Seals as of June 15, 1939 was $22,697.65.

The total amount paid to needy dentists from June 30, 1938, to June 15, 1939, was $12,385.16. The amount paid the previous fiscal year was $9,949.10.

Forty-five states have met the requirements for receiving refunds, and this year $10,509.97 will be distributed to these states. Last year, the amount distributed was $11,581.23. The Dental Relief Fund Committee and the Relief Commission are to be commended for their work.

THE CENTRAL OFFICE

Considerable change has occurred during the past ten or twelve years, and it is interesting to note what the picture shows in respect to the Association. Many comparisons have been made between conditions as they were in 1927 and 1928, or before the crash in 1929, and as they now are after years of critical conditions.

At the close of 1927, the Association had sixteen employes, and appropriations were made for thirteen expense items, covering the activities being carried on at that time. The membership then was 33,000. The Association now has thirty-five employes, and this year's budget contains thirty-two expense items, an increase of more than 100 per cent in both cases. The membership last year was more than 45,000, reflecting an increase of more than 12,000 during this period.

Of course, such expansion should cost more. The Audit Report shows that the total expense for the fiscal year 1927-1928 was $280,085.35; whereas the 1937-1938 report shows a total of $279,458.20, an actual decrease of $627.15.

No doubt, further explanation is in order to clear up this paradoxical situation. In 1928, the expense for the Secretary-Business Manager's Department was $32,555.22. In 1938, this expense was $27,889.69; a decrease of nearly $5,000, although more than 12,000 additional members were being cared for and non-members' subscriptions had more than doubled. The cost of producing

THE JOURNAL in 1938 was only about $1,200 more than in 1928, although the number of copies printed had increased from approximately 400,000 a year to more than 600,000, or more than 50 per cent.

These illustrations are given to illustrate the economies, controls and increase in efficiency that have been instituted during this period, without which this record would not have been possible. The members are not only getting more for their money than they were ten or twelve years ago, but they are also getting a more efficient and helpful service, which no doubt has had much to do with making the increase in membership possible when other organizations have had difficulty in maintaining their position.

AMERICAN DENTAL ASSOCIATION

COMPARISON OF EXPENSES
For the Years Ending June 30, 1928, 1938 and 1939

	1928 33,096 Members	1938 42,201 Members	1939 45,020 Members
Secretary-Business Manager	$ 32,555.22	$ 27,889.69	$ 27,584.05
Journal	117,479.90	118,734.23	124,512.44
Annual Sessions	42,263.95	36,806.91	41,401.59
Bureau of Public Relations	10,153.23	30,631.99	34,071.64
Council on Dental Therapeutics		9,242.08	11,953.01
Bureau of Chemistry	1,264.45	5,546.68	7,583.50
Library Bureau	3,728.52	6,768.69	6,754.10
Treasurer	2,770.71	4,036.78	4,534.57
President	5,428.90	2,400.00	2,400.00
Board of Trustees	3,277.04	5,232.14	4,265.98
Budget & Finance Committee	1,338.05	25.00	196.25
Relief Commission	472.04		
Research Commission	23,801.07	15,500.00	16,321.53
Committee on Dental Index	12,848.25	5,781.08	6,430.35
Dental News	12,246.64		
Dental Education Council	7,108.03	1,208.99	4,467.84
Committee on Legislation	1,165.50	3,161.57	4,480.98
Judicial Council	125.85	149.94	115.00
Korean Clinic Fund, Etc.	2,058.00		
Committee on Membership		1,368.26	1,760.62
National Board of Dental Examiners		2,493.55	3,150.00
Committee on Nomenclature		63.50	
Committee on Economics		1,922.09	1,679.90
National Museum Committee		130.00	480.00
Committee on Dental Health Education		17.31	42.20
Public Health Committee		274.21	357.55
Survey on Women's Auxiliary		2.50	30.49
American Association for Advancement of Science		61.01	15.76
National Committee on Care of Mothers & Babies		10.00	
Scientific Section Committee			899.67
San Francisco Fair Dental Exhibit			5,000.00
New York Fair Dental Exhibit			10,000.00
National Health Program Committee			2,060.33
Villain Memorial			200.00
American Red Cross Committee			100.00
Process Patents Committee			1,000.00
	$280.085.35	$279,458.20	$323,849.35

The foregoing statement is intended to present further information on the activities and operations of the American Dental Association along the lines set forth by the report of the Special Reference Committee which appeared on pages 2060-2064 in the December 1939 issue of THE JOURNAL.

The following statement taken from *The Journal of the American Medical Association,* April 8, 1939, page 1383, is presented with the idea of giving an outside basis of comparison of the expenditures for individual activities and the total expense of our Association. *(The Journal of the A.M.A* was published on a weekly basis with a circulation of approximately 99,000 copies per issue in 1938, while THE JOURNAL of the American Dental Association is published monthly and has an average circulation of more than 50,000 copies per issue.

Our audit report for 1928 shows that the total expense for that fiscal year was $280,085.35; whereas, in 1938, the expenses totaled $279,458.20, an actual decrease of $627.15, although the membership and the number of activities had greatly increased.

In 1928, the expense of the Secretary-Business Manager's Department was $32,555.22, and in 1938 this expense was $27,889.69, a decrease of nearly $5,000, although more than 9,000 additional members were being cared for and nonmember subscriptions had more than doubled. The cost of producing THE JOURNAL in 1938 was only about $1,200 more than in 1928, although the number of copies printed had increased from approximately 400,000 to more than 600,000 or more than 50 per cent.

These illustrations are given to indicate the economies, controls and increase in efficiency that have been instituted in

AMERICAN MEDICAL ASSOCIATION

STATEMENT OF EXPENSES
For the Year Ended December 31, 1938

Total Journal Operating Expenses:		$1,020.940.53
Association Expenses:		
Association	$114,859.42	
Health Education	36,892.70	
Pharmacy and Chemistry	49,331.41	
Clinical Laboratory	24,926.43	
Medical Education & Hospitals	77,180.76	
Therapeutic Research	7,579.18	
Legal Medicine & Legislation	37,670.88	
Bureau of Investigation	12,272.06	
Bureau of Medical Economics	35,457.50	
Council on Foods	22,184.83	
Physical Therapy	17,823.33	
Council on Industrial Health	7,726.70	
Bureau of Association Exhibits	14,122.61	
Laboratory Depreciation	471.46	458,499.27
Miscellaneous Expenses:		
Insurance and Taxes	28,778.38	
Legal and Investigation	67,096.56	
Building Expenses	32,611.64	
Building Depreciation	18,968.18	
Fuel	8,361.96	
Federal Social Security Taxes	30,784.71	
Sundry Publications	103,507.37	290,108.80
Total Expenses		$1,769,548.60

this period without which this record would not have been possible. The members are not only getting more for their money than they were ten or twelve years ago: they are also getting more helpful and efficient service personally, and more is being done for the dental profession as a whole.

It has been the endeavor to distribute the available funds as judiciously and conservatively as possible in order to obtain the best results from the various activities and at the same time provide for expansion where necessary. Examination of the statement showing comparison of expenses for the years 1928, 1938 and 1939 will show that additional activities were provided for in 1938 on slightly less money than was spent in 1928. There is a limit to this possibility, however, and it will be seen that the expenses for 1939 jumped more than $44,000, and the Association would have been in the red had it not been for the help of the income on investments.

This increase in expenses has resulted from higher costs of materials and from the increased demand for service on the part of the membership, together with the immediate necessity of appropriations for new activities and purposes deemed advisable by the Board of Trustees and the House of Delegates. It is evident, therefore, that the expected revenue will be exhausted in taking care of present activities, with no provision for meeting increased demands should they arise.

The Special Reference Committee has called attention to a dozen recommendations that have been made to increase the effectiveness of the Association. It will not be possible to provide for favorable action on these recommendations, and it is doubtful whether present activities can be maintained at the current levels without greater support from the membership.

THE PROCESS PATENT COMMITTEE

SINCE the publication of the Process Patent Committee's report in the November issue of THE JOURNAL, I have received several letters asking what, if anything, our committee plans to do about the high cost of the new denture materials.

The gist of the several communications is expressed in the following paragraph, which I quote from one of the letters. "May I inquire if the threat of monopoly of the acrylic resin patents merits the attention of your committee? With this monopoly, the dental profession stands to bear a much heavier expense for these materials than corresponding costs of similar materials in outside industry."

In all probability, a number of other men have the same question in mind. I am, therefore, presenting the following statement so that the dental profession may understand clearly the obligations of our committee and the purposes for which it was organized.

Section 14, Article 2 of our bylaws reads:

> To ascertain by means of litigation, up through the highest court of record if necessary, the validity of all patents upon processes or methods used in connection with the practice of dentistry, whenever such patent or patents are made use of directly or indirectly for the purpose of collecting royalties or license fees from the dentists of this country or whenever such patents are used in any other manner which tends to hamper the progress or manipulative skill of the dental profession.

The Webb case is a perfect illustration. High frequency machines are not patentable. A dentist is free to use the current on the cheeks or tongue, but if he should

apply it to the gums, he would, according to the Webb patent, become an infringer and liable to court action. This obviously is a direct interference with the dentist's manipulative skill and therefore comes within the scope of the Process Patent Committee, according to the bylaws.

The price of acrylic resin is entirely an economic problem. It may flatten the dentist's pocketbook, but does not in any way hamper his professional services. Of course, the high cost of the newer materials may oblige some patients to accept a lower quality of dentures. This condition, however, is not limited to dentistry. The same is true of food, shelter, clothing and other things used by the indigent.

Whether organized dentistry should concern itself with the economic welfare of its membership to the extent of protecting the average dentist against extortion by the manufacturers of instruments or materials is a matter of opinion. One fact is beyond dispute: the American Dental Association has not the money in its treasury to undertake such costly litigation.

This may surprise some of our members since they do not seem to realize that whatever the amount of their yearly dues may be, the amount received by the Association is only $4. For this small sum, the organization is maintaining an office, a library with a complete staff, a laboratory with a full-time chemist for testing drugs and remedies used in dentistry and an educational publicity department, and must, in addition, meet whatever extra expenses may occur, such as patent litigation. Indeed, people familiar with organization affairs are often surprised at the multiplicity of services which the American Dental Association is rendering to its membership with the small sum of money at its disposal.

If the rank and file expects the American Dental Association to shoulder additional burdens, it must be ready and willing to provide the necessary funds. This may best be done by the increase of our dues. An additional $2 annually would be an insignificant amount and would not tax even our less prosperous members, but $2 multiplied by 45,000 would give the national organization $90,000 a year extra to spend for the dental profession. Perhaps if that amount were available, the Committee on Process Patents could interest itself in the high price of acrylic resin.

M. D. K. Bremner, *Chairman,*
Process Patent Committee.

THE DENTAL RELIEF FUND

A NON-MEMBER'S CONTRIBUTION TO THE RELIEF FUND OF THE AMERICAN DENTAL ASSOCIATION

Many years ago, Dr. Ottolengui presented an appeal to the profession for subscriptions to the Relief Fund.

James F. Moon, 545 Central Avenue, East Orange, N. J., was one of the many thousands who read this appeal, and although he was not, nor has he ever been, a member of the American Dental Association, he decided to contribute the price of one amalgam filling, or $3, *each month* to this cause. Since that time, his check has been received monthly for this amount.

Here is an example of the true spirit of service. Dr. Moon is a very liberal contributor, but, because of his non-

affiliation with the Association, can never himself receive help from the A. D. A. Relief Fund.

The last few years, our records show that only one out of every three of our own members is contributing to this very worthy activity.

Dr. Merritt, in his President's message, says, "Of all the activities of the American Dental Association, none is more worthwhile than the Relief Fund."

While we, as members, sit back in our easy chairs, blessed with health and the privilege of continuing the practice of our chosen profession, let us not forget those who have not been so fortunate.

The demands on the Relief Fund are growing rapidly. Relief to the extent of $20,000 reached our distressed members last year.

HAVE YOU MADE YOUR 1939 SEAL CONTRIBUTION?

E. E. GRAHAM, *Secretary*,
Chicago, Ill.

AMERICAN PHARMACOPEIAL CONVENTION

AN invitation has been extended to the American Dental Association to participate in the American Pharmacopeial Convention to be held in 1940, for the purpose of revision of the Pharmacopeia of the United States.

It was voted by the Trustees that the American Dental Association accept the invitation to participate in the American Pharmacopeial Convention and authorize the Council on Dental Therapeutics to appoint a committee as suggested, the expenses to be paid out of the budget of the Council on Dental Therapeutics.

NATION WIDE DENTAL CENTENNIAL DINNERS
March 11, 1940

DENTISTRY throughout the world has looked forward to celebrating its one hundredth anniversary. It is gratifying to know that plans are now complete to hold a Dental Centenary Celebration in Baltimore, March 18-19-20, 1940.

The meeting in Baltimore promises to be a memorable affair, and while every member of organized dentistry is urged to be present, it is realized that, for some, attendance will not be possible. Consequently, plans have now been completed which will enable every component dental society, no matter how large or how small, to hold a centennial dinner Monday evening, March 11, 1940.

Dr. Merritt, President of the A.D.A., has written to all component society officers requesting their cooperation in holding these dinners. He has appointed a special committee composed of O. W. Brandhorst, chairman, Harold S. Smith and Lon W. Morrey to formulate plans and assist the local societies (if need be) in their preparations for these dinners. By the early part of January, the committee will have sent suggestions for the dinner program and for publicity to every component society officer.

It is hoped that holding 400 or more centennial dinners simultaneously throughout the country will enable our members to participate in this commemorative occasion in an impressive manner. Furthermore, it should focus public attention on the achievements of dental science and its service to mankind.

Every member of the Association is urged to contact and help his society officers to make these March 11 dinners a success.

THE DENTAL CENTENNIAL

On the Sunday (March 17) preceding the Centenary Celebration, the American College of Dentists, the American Association of Dental Editors and the *Journal of Dental Research* are planning an all-day program to memorialize the organization of literature and research. They have asked the American Dental Association to present on Sunday morning a two-hour program given over to organization and representing organized dentistry in the United States. Invitation is being extended to the American Dental Association by the College to take part and, in the evening, to be the guests of the American College of Dentists.

REPORT OF AMERICAN HOSPITAL COMMITTEE

At the request of the Hospital Association of the United States and a like organization in Canada, the President of the American Dental Association has appointed a committee of two to contact a similar committee from these two hospital organizations, in order to make a study the purpose of which is to attempt to secure uniform regulations for the services of dentists as interns or residents in hospitals. There is to be a joint meeting of the Hospital Associations of the United States and Canada. One of the problems for discussion will concern the minimum requirements for proper dental service in such approved hospitals as desire to institute dental service at this time.

The approved action of those organizations will ultimately find its way into the rules and regulations of the hospital associations of the two countries. Those seeking advice and direction as to what would be acceptable to hospitals and the dental profession would find such information in their manual, which is now being revised and will be published probably two years from now.

W. H. G. Logan, *Chairman.*

REFRESHER COURSES IN DENTAL DIAGNOSIS AND PERIODONTIA

SCHOOL OF DENTAL AND ORAL SURGERY, COLUMBIA UNIVERSITY

The School of Dental and Oral Surgery, Columbia University offers refresher courses in periodontia (June 10-21) and dental diagnosis (March 20 to May 22).

The courses will be given at the School of Dental and Oral Surgery, Columbia University, and are designed to bring practitioners abreast of modern undergraduate teaching in theory and practice in the subjects.

Admission to the courses is limited to qualified graduates in dentistry who are members in good standing of the American Dental Association or recognized sectional organizations. In the case of foreign applicants, membership in the applicant's national dental organization is required.

Applications accompanied by $10 reservation deposit should be sent to the assistant to the registrar, School of Dental and Oral Surgery, 630 West 168th Street, New York, N. Y.

POSTGRADUATE DENTISTRY

POSTGRADUATE courses limited to small classes will be given under the auspices of the Alumni Society of the Philadelphia Dental College (Dental School of Temple University) next semester, beginning February 7. These courses will cover three phases of dental practice: oral surgery, periodontia and medicine and are under the direction of James R. Cameron, John A. Kolmer and Frederic James.

A limited number of graduates will be permitted to register in each course. Those taking oral surgery will be permitted to take only this course, and the number of students will be limited to ten. The course will require ten full days, and will be given on Wednesday 9 a.m. to 5 p.m. Every effort will be made to give each student the opportunity to perform certain operations if sufficient clinical material is available. Lectures will be given on the physiology of respiration, surgical anatomy of the face and neck, the phases of oral surgery and topics of interest to the general practitioner. Clinics will be conducted in anesthesia, exodontia, and oral surgery.

The facilities of the dental school and Temple University Hospital will be available for these courses and it is expected that more than enough clinical material will be available.

It is necessary to limit the number registering in each course in order to provide the maximum of instruction and observation of the material presented. Therefore, students will be accepted only in the order of registration, and not more than the maximum.

For further information address

EDWARD RAY STRAYER, *Chairman,*
Alumni Committee on Extension Courses,
Dean's Office,
1808 Spring Garden St.,
Philadelphia, Pa.

COMMITTEE ON LEGISLATION

DENTISTS AS MEDICAL PRACTITIONERS WITHIN "PRIVILEGED COMMUNICATION" STATUTES

By LESLIE CHILDS, Indianapolis, Ind.

STATUTES declaring professional communications between patients and their medical advisers to be privileged have been widely enacted and are quite generally upheld on the broad ground of public policy. In their construction, the question of whether dentists are to be deemed medical practitioners, within the meaning of the privilege granted, has been litigated in a number of well-reasoned cases.

However, in the absence of a positive legislative provision to that effect, the courts have usually declined to so extend such statutes by implication. This rule, and the reasoning upon which it is founded, is illustrated in the following cases.

DENTIST CALLED AS WITNESS

In Gulf, Mobile & N. R. Co. vs. Willis, 171 Miss. 732, 157 So. 899, a section of the Mississippi code relating to privileged communications was up for construction. This section provided that:

"All communications made to a physician or surgeon by a patient under his charge or by one seeking professional advice are hereby declared to be privileged, and such physician or surgeon shall not be required to disclose the same in any legal proceedings, except at the instance of the patient."

Here, the plaintiff had brought suit for damages against the defendant for injuries alleged to have been received when the defendant's servant assaulted him. Among the injuries claimed to have been inflicted was the breaking of a tooth, which the plaintiff testified that he had had treated by a named dentist.

The defendant thereupon called the dentist as a witness and sought to show by him the character of the injury that the plaintiff had in fact received. The plaintiff objected to this testimony on the ground that the dentist was a physician within the meaning of the statute quoted heretofore, and that professional communications made to him were privileged. On appeal, the higher court in denying this contention reasoned as follows:

We are of opinion that a dentist is not a physician within the intent and meaning of [the Code]. The purpose of this statute was to protect physicians and surgeons from having to testify as to communications made to them in their professional capacity, and to protect patients from having to disclose statements made to physicians. The statute must be limited to its language and clear purpose. It has the effect of preventing facts from being disclosed which would often be material to the administration of justice, and should not be extended by construction.

So too, in Howe vs. Rogensburg et al., 75 Misc. 132, 132 N.Y.S. 837 (Supreme Court, Appellate Term), the court declined to extend the New York statute by implication. The section of the statute involved provided that:

PROVISION OF STATUTE

A person duly authorized to practice physic or surgery, or a professional or registered nurse, shall not be allowed to disclose any information which he acquired in attending a patient, in a professional capacity, and which was necessary to enable him to act in that capacity.

In this case, the plaintiff, a duly licensed dentist, sought to recover for services he had rendered the defendant's testator, who had died subsequently thereto. The defendant objected to the plaintiff's testimony as to the services rendered on the ground that his professional contacts with the deceased were privileged within the meaning of the statute quoted above. In reasoning on the question, and in denying the defendant's contention, the court, among other things, said:

. . . we think that it is clear that the Legislature did not intend to include a dentist within the provision of this section of the Code. Strictly speaking, a dentist might be included within the description relating to those who practice "surgery"; but, as the term "surgery" is employed in the statute, it does not include one engaged in the practice of dentistry.

At common law, communications between physician and patient were not legally privileged. . . . To the extent, therefore, to which the privilege can now be said to exist, it must find its support in some statutory enactment. Whatever may be urged for or against the existence of the privilege, we can see no good reason for extending it by implication or construction.

In the People vs. De France, 104 Mich. 563, 62 N.W. 709, the point here involved was raised under the Michigan statute that carried the following provision:

No person duly authorized to practice physic or surgery shall be allowed to disclose any information which he may have acquired in attending any patient in his professional character, and which information was necessary to enable him to prescribe for such patient as a physician, or to do any act for him as a surgeon.

In this case, a man was being tried for

forgery, and the case turned on the question of his identity, which the state attempted to prove by the testimony of a dentist who had performed certain dental work for the accused. The latter objected to the testimony of the dentist on the ground that the information divulged was obtained in his professional capacity, within the terms of the statute heretofore quoted from. In reasoning upon the question, the court, among other things, said:

WHAT THE COURT DECIDED

The question presented is whether this language includes a dentist. . . . The purpose of this statute was to throw around such disclosures as the pătient is bound to make for the information of his attending physician the cloak of secrecy, and the prime object of the act was to invite confidence in respect to ailments of a secret nature, and the spirit of the act would not include a case wherein the infirmity was apparent to every one on inspection. . . .

It is apparent that the act relates to general practitioners, and to those whose business as a whole comes within the definition of "physician" or "surgeon." A dentist is one whose profession is to clean and extract teeth, repair them when diseased and replace them, when necessary, by artificial ones. . . . We think there was no error in admitting the testimony of this witness; that he is not within the terms or the spirit of the act.

The foregoing decisions fairly reflect the case law of the subject here involved. And here we find, by the weight of authority, that dentists are not deemed medical practitioners within the terms of privileged communication statutes relating to physicians and surgeons, in the absence of a specific provision to that effect, or at least words that fairly import their inclusion.

In other words, since such a grant of privilege is purely statutory, without basis in the common law, the letter of the terms used will be observed, and the coverage therein will not be enlarged or extended by construction or implication.

1520 East Tenth Street.

NEW BOOKLET OF NATIONAL HEALTH PROGRAM COMMITTEE

THE National Health Program Committee has in preparation a booklet which surveys all of the recent activity leading to the formation of a national health program and explains the position of the American Dental Association on the matter. A copy of this booklet will be mailed to each member early in January.

1840 1940

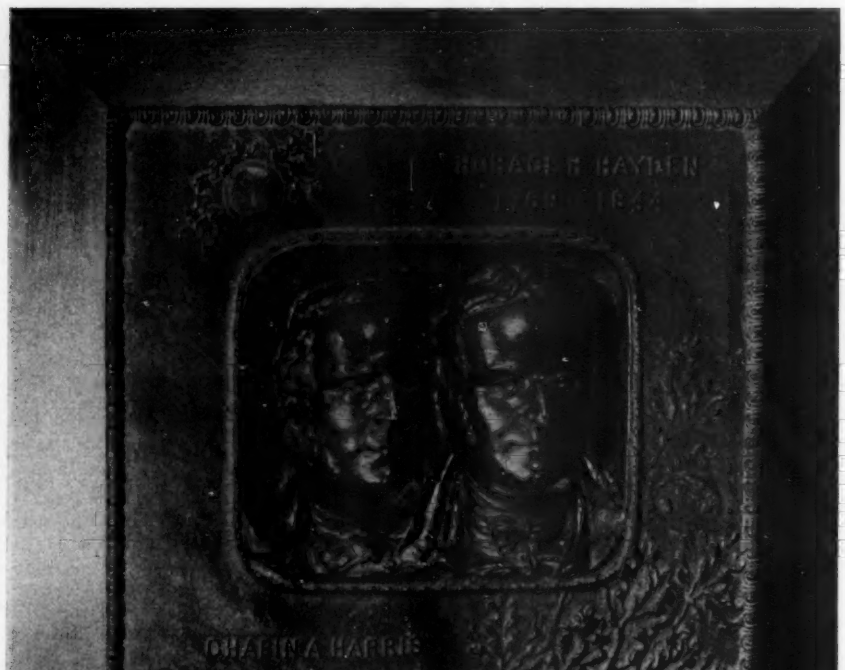
Dental Centenary Celebration

MARCH 18-20, 1940 BALTIMORE

SPONSOR

AMERICAN DENTAL ASSOCIATION

For the Preliminary Program and Other Centenary Information Consult the Dental Journals



DENTAL CENTENARY CELEBRATION
SCHEDULE OF HOTEL RATES
BALTIMORE, MD., MARCH 18, 19, 20, 1940

Hotels	Single	Double
*ABBEY, 723 St. Paul St.	$1.00 – 2.00	$2.00 – 3.00
ALTAMONT, Eutaw Place & Lanvale Sts.	2.50 – 3.00	3.00 – 4.00
ARUNDEL, Charles St. & Mt. Royal Ave.	2.50 – 3.00	3.00 – 4.00
*BALTIMOREAN, 2905 N. Charles St.	3.00	4.00
BELVEDERE, Charles & Chase Sts.	3.50 – 7.00	5.50 – 9.00
*BILTMORE, Fayette & Paca Sts.	2.00 – 2.50	3.50 – 4.50
*BLACKSTONE (APARTMENT HOTEL), Charles & 33rd Sts.	2.50	4.00
*BRADFORD (APARTMENT HOTEL), 3301 St. Paul St.	3.00	4.00
*CHARLES (APARTMENT HOTEL), 3333 N. Charles St.	3.00	4.00
*COLONNADE, 1337 W. Mt. Royal Ave.	1.00 – 2.00	2.00 – 2.50
CONGRESS, 306 W. Franklin St.	2.50 – 3.00	4.00 – 5.00
EMERSON, Calvert & Baltimore Sts.	3.00 – 6.00	4.50 – 8.00
*FRANKLIN, 410 W. Franklin St.	1.00 – 2.00	2.00 – 2.50
*ALCAZAR (KNIGHTS OF COLUMBUS), Cathedral & Madison Sts.	1.00 – 2.50	3.00 – 5.00
*LATROBE (APARTMENT HOTEL), Charles & Read Sts.	2.50 – 3.00	5.00 – 6.00
*LONGFELLOW, 2 West Madison St.	2.00 – 3.00	3.00 – 6.00
LORD BALTIMORE, Baltimore & Hanover Sts.	3.00 – 6.00	5.00 – 8.00
*MADISON (APARTMENT HOTEL), 817 St. Paul St.	3.00	4.00 – 5.00
*MALLONEE, 111 W. Mulberry St.	1.00 – 1.50	2.50 – 3.00
*MARYLAND, 20 E. Fayette St.	2.00 – 2.50	3.00 – 4.00
*MILNER, Cathedral & Read Sts.	1.00 – 1.50	1.50 – 2.00
*MT. ROYAL, Mt. Royal Ave. & Calvert St.	2.50 – 3.00	3.50 – 5.00
NEW HOWARD, 8 N. Howard St.	2.50 – 3.00	3.50 – 5.00
*ONE HUNDRED AND ONE WEST MONUMENT ST. (APT. HOTEL)	3.00	4.00
*PLAZA, Charles St. & Mt. Royal Ave.	1.00 – 2.00	2.00 – 2.50
*REID, 212 W. Camden St.	1.00 – 1.50	1.50 – 2.00
RENNERT, Liberty & Saratoga Sts.	2.50 – 4.00	3.50 – 7.00
*SHERWOOD, 212 W. Monument St.	1.25 – 1.50	2.00 – 2.50
*SHIRLEY, 205 W. Madison St.	1.50	2.00
SOUTHERN, Light and Redwood Sts.	3.00 – 5.00	5.00 – 6.50
STAFFORD, Charles & Madison Sts.	3.00 – 4.00	5.50 – 7.00
*TEN HUNDRED AND ONE ST. PAUL ST. (APT. HOTEL)	3.00	4.00 – 6.00
*WALDORF, 1829 N. Charles St.	1.00 – 2.50	2.50 – 3.00
*WESTMINSTER, 418 W. Fayette St.	1.00 – 1.50	2.00 – 2.50
*Y. M. C. A., Cathedral & Franklin Sts.	1.00 – 1.25	1.50 – 2.00

Rates quoted are with and without bath.
*Hotels with less than 100 rooms.
The Centennial Committee on Hotels advises making reservations early.

DIRECTORY OF STATE SOCIETY OFFICERS AND DATES OF MEETINGS, 1939-1940

ALABAMA DENTAL ASSOCIATION

George Wheeler, President.....
.....117 Adams Ave., Montgomery
Hunter S. Allen, President Elect.....
.....Comer Bldg., Birmingham
George W. Matthews, Secretary-Treasurer..
....905 Protective Life Bldg., Birmingham
Next annual meeting: Tutwiler Hotel, Birmingham, April 9-11, 1940.

ARIZONA STATE DENTAL SOCIETY

John V. Cogan, President.....
.....Speedway & 2nd Ave., Tucson
W. R. Pinkerton, President Elect.....
.....Legett Bldg., Douglas
Melvin Saxman, Secretary-Treasurer.....
.....Professional Bldg., Phoenix
Next annual meeting: Tucson, April, 1940.

ARKANSAS STATE DENTAL ASSOCIATION

R. R. Wilson, President.....Waldron
H. J. Green, President Elect.....Paragould
I. M. Sternberg, Secretary-Treasurer.....
...Merchants Natl. Bank Bldg., Fort Smith
Next annual meeting: Little Rock, May 20-22, 1940.

CALIFORNIA STATE DENTAL ASSOCIATION

Raoul H. Blanquie, President.....
.....870 Market St., San Francisco
Robert F. Thayer, President Elect.....
.....1736 Franklin St., Oakland
Frederick T. West, Secretary.....
.....2180 Washington St., San Francisco
John W. Leggett, Treasurer.....
.....490 Post St., San Francisco
Next annual meeting: Oakland, May 13-15, 1940.

SOUTHERN CALIFORNIA STATE DENTAL ASSOCIATION

David W. McLean, President.....
.....3780 Wilshire Blvd., Los Angeles
Guy Van Buskirk, President Elect.....
.....1930 Wilshire Blvd., Los Angeles
Francis J. Conley, Secretary.....
.....804 Professional Bldg., Los Angeles
Harry H. Bleecker, Treasurer.....
.....727 West Seventh St., Los Angeles
Next annual meeting: Los Angeles, October 1940.

COLORADO STATE DENTAL ASSOCIATION

Edwin C. Carter, President.....
.....962 Metropolitan Bldg., Denver
C. J. Brown, Vice President.....
.....McNeen Block, La Junta
R. L. Christy, Secretary.....
.....820 Majestic Bldg., Denver
Charles H. Watson, Treasurer.....
.....500 Metropolitan Bldg., Denver
Next annual meeting: Broadmoor Hotel, Colorado Springs, June 20-22, 1940.

CONNECTICUT STATE DENTAL ASSOCIATION

W. J. Murray, President.....
.....302 State St., New London
Gilbert Kilduff, President Elect.....
.....111 W. Main St., Waterbury
C. W. Vivian, Secretary-Treasurer.....
.....58 Elbridge Rd., New Britain
Next annual meeting: Hotel Griswold, Eastern Point, New London, June 5-7, 1940.

DELAWARE STATE DENTAL SOCIETY

J. Paul Wintrup, President.....
.....Medical Arts Bldg., Wilmington
Russell J. Emory, Vice President..Harrington
John D. Newell, Secretary.....
.....610 Delaware Ave., Wilmington
Frank Hooper, Treasurer.....
.....807 Washington St., Wilmington

DISTRICT OF COLUMBIA DENTAL SOCIETY

W. Marion Falls, President.....
....1801 Eye St. N. W., Washington, D. C.
Daniel F. Lynch, Secretary-Treasurer.....
...2651 16th St. N. W., Washington, D. C.
Next annual meeting: Willard Hotel, Washington, D. C., Five-State Post Graduate Clinic, May 19-23, 1940.

FLORIDA STATE DENTAL SOCIETY

E. B. Penn, President.....
.....347 Seybold Bldg., Miami
I. W. Shields, President Elect.....
.....Huntington Bldg., Miami
E. C. Lunsford, Secretary-Treasurer.....
.....2742 Biscayne Blvd., Miami

GEORGIA DENTAL ASSOCIATION

Pope Holliday, President.....Athens
Semon Eisenberg, President Elect...Savannah
R. H. Murphy, Secretary.....
.....920 Georgia Casualty Bldg., Macon
Frank Tillery, Treasurer.....Columbus
Next annual meeting: Hotel Dempsey, Macon, May 14-16, 1940.

HAWAII TERRITORIAL DENTAL SOCIETY

Edward C. Hoey, President.....
.....Dillingham Bldg., Honolulu
F. M. Branch, President Elect.....
.....305 Boston Bldg., Honolulu
John H. Dawe, Secretary.....
.....Palama Settlement, Honolulu
Adrian Brash, Treasurer.....
.....Young Bldg., Honolulu
Next annual meeting: Honolulu, August 1940.

IDAHO STATE DENTAL ASSOCIATION

Stewart Barkdull, President.....Blackfoot
P. F. Flack, President Elect.....Boise
G. B. Crabtree, Secretary.....Idaho Falls
L. E. Shaw, Treasurer.....Pocatello
Next annual meeting: Sun Valley, June 23-25, 1940.

ILLINOIS STATE DENTAL SOCIETY

Earl P. Boulger, President.....
.....27 S. Pulaski Road, Chicago
John J. Donelan, President Elect.....
...United Mine Workers Bldg., Springfield
Laverne H. Jacob, Secretary.....
.....634 Jefferson Bldg., Peoria
J. Roy Blayney, Treasurer.....
.....950 E. 59th St., Chicago
Next annual meeting: Springfield, May 13-16, 1940.

INDIANA STATE DENTAL ASSOCIATION

R. C. Shurr, President.....
..5-6 Premier Theatre Bldg., Indianapolis
B. K. Westfall, President Elect.....
...1006 Hume Mansur Bldg., Indianapolis
E. E. Ewbank, Secretary.....Kingman
William Bogie, Treasurer.....
.....214 Main St., Vincennes
Next annual meeting: Claypool Hotel, Indianapolis, May 20-22, 1940.

IOWA STATE DENTAL SOCIETY

E. H. Ford, President.....
.....1114 Equitable Bldg., Des Moines
C. T. Brann, President Elect.....
...1000 First Natl. Bank Bldg., Davenport
C. S. Foster, Secretary.....
.....803 Dows Bldg., Cedar Rapids
L. C. Dow, Treasurer.....Marion
Next annual meeting: Des Moines, May 6-8, 1940.

KANSAS STATE DENTAL ASSOCIATION

C. Harry House, President.....Arkansas City
John E. Morgan, President Elect....Emporia
Fred A. Richmond, Secretary.....
.....Huron Bldg., Kansas City
W. T. Triplett, Treasurer.....Salina
Next annual meeting: Missouri-Kansas Bi-State Meeting, Kansas City, Mo., April 28-May 1, 1940.

KENTUCKY STATE DENTAL ASSOCIATION

O. B. Heavrin, President.....
.....106½ W. 2nd St., Owensboro
J. H. Fullenwider, President Elect.....
.....Heyburn Bldg., Louisville
J. L. Walker, Secretary-Treasurer.....
.....640 Barbee Way South, Louisville
Next annual meeting: Hotel Owensboro, Owensboro, April 11-13, 1940.

LOUISIANA STATE DENTAL SOCIETY

Nathan G. Gaston, President.....
.....309 Bernhardt Bldg., Monroe
Samuel D. Gore, President Elect.....
..1237 Maison Blanche Bldg., New Orleans
Julian S. Bernhard, Secretary.....
.....417 Medical Arts Bldg., Shreveport
Oscar J. Ory, Treasurer.....Garyville
Next annual meeting: Monroe, April 18-20, 1940.

MAINE DENTAL SOCIETY

Arthur W. Easton, President.....Norway
A. C. Thompson, President Elect.....
.....11 Deering St., Portland
Philip W. Woods, Secretary.....
.....State Dept. of Health, Portland

Henry H. Grant, Treasurer.....
.....655 Congress St., Portland
Next annual meeting: Lakewood, June 23-25, 1940.

MARYLAND STATE DENTAL ASSOCIATION

C. Adam Bock, President.....
.....806 Cathedral St., Baltimore
Harry B. McCarthy, President Elect.....
.....Medical Arts Bldg., Baltimore
Meyer Eggnatz, Secretary.....
.....Medical Arts Bldg., Baltimore
John M. Hyson, Treasurer.....
.....2128 St. Paul St., Baltimore
Next annual meeting: Baltimore.

MASSACHUSETTS DENTAL SOCIETY

William H. Griffin, President.....
.....520 Beacon St., Boston
George Cowles Brown, President Elect....
.....332 Main St., Worcester
Philip E. Adams, Secretary.....
.....106 Marlborough St., Boston
Joseph T. Paul, Treasurer.....
.....419 Boylston St., Boston
Next annual meeting: Hotel Statler, Boston, April 22-25, 1940.

MICHIGAN STATE DENTAL SOCIETY

Paul H. Jeserich, President.....
..School of Dentistry, U. of M., Ann Arbor
F. J. Henry, President Elect.....
...1170 Madison Ave. S. E., Grand Rapids
William R. Davis, Secretary.....
.....Michigan Dept. of Health, Lansing
H. C. Gerber, Executive Secretary.....
.....1514 Olds Tower, Lansing
E. J. Chamberlin, Treasurer.....
.....520 Ashton Bldg., Grand Rapids
Next annual meeting: Detroit, April 15-17, 1940.

MINNESOTA STATE DENTAL ASSOCIATION

E. J. Simon, President.....
.....1020 Lowry Bldg., St. Paul
T. P. Ryan, President Elect.....
.....949 Medical Arts Bldg., Minneapolis
L. M. Cruttenden, Secretary.....
.....481 Lowry Bldg., St. Paul
A. R. Schmid, Treasurer.....Worthington
Next annual meeting: Municipal Auditorium, St. Paul, February 27-29, 1940.

MISSISSIPPI DENTAL ASSOCIATION

J. A. Evans, President.....Bay St. Louis
F. C. Williams, Jr., President Elect..Corinth
George P. Evans, Secretary-Treasurer.Jackson
Next annual meeting: Jackson, April 15-17, 1940.

MISSOURI STATE DENTAL ASSOCIATION

J. Emmett Northcutt, President.....
.....1107 Bryant Bldg., Kansas City
W. A. Haas, President Elect.....
.....411 Tootle Bldg., St. Joseph
C. W. Digges, Secretary-Treasurer..Columbia
Next annual meeting: Missouri-Kansas Bi-State Meeting, Kansas City, Mo., April 28-May 1, 1940.

MONTANA STATE DENTAL ASSOCIATION

J. J. Hall, President.....Helena
W. W. Cloyd, President Elect.....Livingston
T. T. Rider, Secretary-Treasurer.....
.....9 Higgins Block, Missoula
Next annual meeting: Billings, May 2-4, 1940.

NEBRASKA STATE DENTAL ASSOCIATION

G. L. Spencer, President.....
.....Sharp Bldg., Lincoln
H. E. Snyder, President Elect.....Columbus
F. A. Pierson, Secretary.....
.....1112 Federal Securities Bldg., Lincoln
C. A. Bumstead, Treasurer.....
.....Stuart Bldg., Lincoln
Next annual meeting: Lincoln, May 20-23, 1940.

NEVADA STATE DENTAL ASSOCIATION

George A. Carr, President...Box 2343, Reno
C. E. Rhodes, President Elect.Box 1550, Reno
L. M. Nelson, Secretary-Treasurer.....
.....Box 2029, Reno
Next annual meeting: Reno, June 8, 1940.

NEW HAMPSHIRE DENTAL SOCIETY

John H. Kiniry, President.....
.....1037 Elm St., Manchester
William H. Putney, President Elect..Concord
Floyd E. Williams, Secretary.....
.....814 Elm St., Manchester
William A. Young, Treasurer.....
.....40 No. Main St., Concord
Next annual meeting: North Conway, June 1940.

NEW JERSEY STATE DENTAL SOCIETY

Craft A. Hopper, President.....534 Broadway, Paterson
Frank J. Houghton, President Elect.....921 Bergen Ave., Jersey City
F. K. Heazelton, Secretary.....223 East Hanover St., Trenton
Charles P. Crowe, Treasurer.....521 Main St., East Orange
Next annual meeting: Berkeley-Carteret Hotel, Asbury Park, May 8-10, 1940.

NEW MEXICO STATE DENTAL SOCIETY

M. V. Berardinelli, President.....Santa Fe
Fred Muller, President Elect.....Taos
J. S. Eilar, Secretary-Treasurer.....521 First Natl. Bank Bldg., Albuquerque
Next annual meeting: Santa Fe, June 1940.

DENTAL SOCIETY OF THE STATE OF NEW YORK

Paul Jones, President.....89 East Avenue, Rochester
W. Ray Montgomery, President Elect.....675 Delaware Ave., Buffalo
Charles A. Wilkie, Secretary.....1 Hanson Place, Brooklyn
George D. Greenwood, Treasurer.....1172 Mercantile Bldg., Rochester
Next annual meeting: Hotel Statler, Buffalo, May 14-17, 1940.

NORTH CAROLINA DENTAL SOCIETY

Frank O. Alford, President.....Charlotte
C. M. Parks, President Elect..Winston-Salem
Paul Fitzgerald, Secretary-Treasurer..... Greenville
Next annual meeting: Charlotte Hotel, Charlotte, May 6-8, 1940.

NORTH DAKOTA STATE DENTAL ASSOCIATION

J. K. Blunt, President.....Bismarck
V. B. Abbott, President Elect.....Minot
W. D. Toepke, Secretary.....New Salem
H. J. Weir, Treasurer.....Dickinson
Next annual meeting: Bismarck, May 5-7, 1940.

OHIO STATE DENTAL SOCIETY

Van B. Dalton, President.....116 Garfield Place, Cincinnati
William H. Wolford, President Elect.....708 Farmers Bank Bldg., Mansfield
Edward C. Mills, Secretary.....255 East Broad St., Columbus
Robert M. Appleman, Treasurer.....40 South 3rd St., Columbus
Next annual meeting: Cincinnati, November 1940.

OKLAHOMA STATE DENTAL SOCIETY

O. F. Sinks, President.....504 Dental Arts Bldg., Tulsa
H. H. Sorrels, President Elect.....1003 Medical Arts Bldg., Oklahoma City
O. W. Boyer, Secretary.....Perry
W. C. Travis, Treasurer.....Chickasha
Next annual meeting: Mayo Hotel, Tulsa, April 14-16, 1940.

OREGON STATE DENTAL ASSOCIATION

Leo M. Boire, President.....Morgan Bldg., Portland
S. C. Robinson, President Elect.....Selling Bldg., Portland
F. W. Hollister, Secretary-Treasurer.....Selling Bldg., Portland
Next annual meeting: Portland, June 12-15, 1940.

PANAMA CANAL ZONE DENTAL SOCIETY

W. D. White, President.....Fort Amador
A. DeCastro, Vice President.....Box 640, Panama City
William H. Clinchard, Secretary-Treasurer.....Box 71, Pedro Miguel

PENNSYLVANIA STATE DENTAL SOCIETY

G. S. Phillips, President.....Masonic Bldg., Meadville
W. J. Robinson, President Elect.....4906 Walnut St., Philadelphia
A. M. Voegelin, Secretary.....5306 N. Broad St., Philadelphia
W. D. Kelly, Treasurer.....Payne-Shoemaker Bldg., Harrisburg
C. J. Hollister, Executive Secretary.....217 State Street, Harrisburg
Next annual meeting: Aboard ship from Erie, June 13-16, 1940.

NATIONAL DENTAL SOCIETY OF THE PHILIPPINE ISLANDS

Joaquin Ladao, President.....208 Kneedler Bldg., Manila
Gil Montinela, Vice President.....Manila
Faustino F. Turla, Secretary-Treasurer.....777 Legarda St., Manila

DENTAL ASSOCIATION OF PUERTO RICO

Jose Vicente, President.....San Juan
Juan Font Suarez, Secretary.....Santurce
L. Ramirez Santi Banez, Treasurer..San Juan

RHODE ISLAND STATE DENTAL SOCIETY

Edward C. Morin, President.....
.....188 Main St., Pawtucket
Raymond L. Webster, President Elect.....
.....155 Angell St., Providence
Edwin K. Devine, Secretary.....
.....708 Union Trust Bldg., Providence
Thomas W. Clune, Treasurer.....
.....1282 Cranston St., Cranston
Next annual meeting: Biltmore Hotel, Providence, January 17-18, 1940.

SOUTH CAROLINA STATE DENTAL ASSOCIATION

C. M. Sanders, President.....Anderson
E. P. Durant, Vice President.....Sumter
E. G. Bumgardner, President Elect.Columbia
P. B. Hair, Secretary-Treasurer..Spartanburg
Next annual meeting: Spartanburg, May 20-21, 1940.

SOUTH DAKOTA STATE DENTAL SOCIETY

C. H. Boyden, President.....Mitchell
J. W. King, President Elect.....Aberdeen
Ernest W. Elmen, Secretary.....Sioux Falls
W. H. Morgans, Treasurer.....Aberdeen
Next annual meeting: Sioux Falls, May 12-14, 1940.

TENNESSEE STATE DENTAL ASSOCIATION

E. J. Justis, President.....
.....1504 Exchange Bldg., Memphis
J. Guilford Sharp, President Elect.....
.....604 Medical Arts Bldg., Knoxville
Howard M. Taylor, Secretary-Treasurer...
.....206 Medical Arts Bldg., Knoxville
Next annual meeting: Hotel Peabody, Memphis, May 13-16, 1940.

TEXAS STATE DENTAL SOCIETY

T. G. Duckworth, President.....
.....Medical Arts Bldg., San Antonio
Monte R. Garrison, President Elect.....
.....Hamilton Bldg., Wichita Falls
L. Willard Ogle, Secretary-Treasurer.....
.....313 Medical Arts Bldg., Dallas
Next annual meeting: Dallas, April 9-11, 1940.

UTAH STATE DENTAL ASSOCIATION

M. W. Merrill, President.....Provo
K. W. Merrill, President Elect.....
....507 Medical Arts Bldg., Salt Lake City
D. L. Folsom, Secretary-Treasurer.....
..1101 First Natl. Bk. Bldg., Salt Lake City
Next annual meeting: Salt Lake City, June 1940.

VERMONT STATE DENTAL SOCIETY

Maxwell L. Jameson, President....Burlington
Harold E. Spear, President Elect....Swanton
Howard H. Reid, Secretary.....Barre
Howard F. Killary, Treasurer.....Burlington
Next annual meeting: Burlington, May 15-16, 1940.

VIRGINIA STATE DENTAL ASSOCIATION

J. P. Irby, President.....Blackstone
M. S. Jenkins, President Elect.....
.....Medical Arts Bldg., Roanoke
J. E. Johnson, Secretary-Treasurer.....
.....804 Medical Arts Bldg., Roanoke
Next annual meeting: Lynchburg, May 13-15, 1940.

WASHINGTON STATE DENTAL ASSOCIATION

A. A. Campbell, President.....
.....Baker Bldg., Walla Walla
L. W. Zech, President Elect.....
.....Medical & Dental Bldg., Seattle
A. W. Jeffery, Secretary-Treasurer.....
.....Medical & Dental Bldg., Seattle
Next annual meeting: Walla Walla.

WEST VIRGINIA STATE DENTAL SOCIETY

A. C. Plant, President.....Wheeling
N. H. Baker, President Elect.....Charleston
C. G. Anderson, Secretary.....Mount Hope
John S. Stone, Treasurer.....Clarksburg
Next annual meeting: Charleston, May 20-22, 1940.

WISCONSIN STATE DENTAL SOCIETY

George W. Wilson, President.....
.....604 No. 16th St., Milwaukee
E. H. Redeman, President Elect....Marinette
Miss Ruth Kroger, Secretary.....
.....1233 Bankers Bldg., Milwaukee
C. P. Collins, Treasurer.....
.....625—57th St., Kenosha
Next annual meeting: April 22-25, 1940.

WYOMING STATE DENTAL ASSOCIATION

James Pepper, President.....Rawlins
P. J. Kane, Vice President.....Sheridan
J. D. McNiff, Secretary-Treasurer.....
.....208 Grand Avenue, Laramie
Next annual meeting: Rock Springs, June 1940.

A-D-A 1940 APPOINTMENT BOOK

THREE years ago, at the request of many members, the Bureau of Public Relations developed a dignified, handsome and inexpensive appointment book. It met with instantaneous success. The first year's output was oversubscribed; the second year's output, although doubled, was also oversubscribed. This year's volume was again increased in order to meet the increasing demand.

The appointment book is another evidence of service which the American Dental Association is rendering its members.

Apparently, it is a service that is much appreciated. There are a few 1940 books on hand. Should you need one, turn to page A-36 and fill out and send in the order blank at once. The supply is limited.

DENTAL LECTURES IN MONTANA NURSING TRAINING SCHOOLS

MONTANA, through the cooperation of the state dental society, the state nursing association and the state department of education, has inaugurated a course of ten lectures on dental health in all accredited nursing schools and in all state normal schools. These include the Normal Division of the Montana State University and the Normal Division of the Northern Division of the state university.

The outline of the lectures was supplied by the American Dental Association.

DENTISTRY AND THE SCOUT MOVEMENT

THE Louisiana State Dental Society and the Louisiana State Medical Society recently passed a resolution recommending that all members place in their waiting room a copy of The Boy Scout Manual, The Girl Scout Manual and the Cubbing Manual. The interest shown by boys and girls and by their parents in these books is so impressive that the Louisiana State Dental and Medical societies wish to further the good cause. It would be an excellent idea for all members of the A.D.A. to have a set of these manuals in their reception room.

BUREAU OF PUBLIC RELATIONS

ANNUAL REPORT
1938-1939
SCHOOL DENTAL CLINIC OF THE PALO ALTO (CALIFORNIA) PUBLIC SCHOOLS

By E. Pearl Hannah,* D.D.S., Palo Alto, Calif.

INTRODUCTION

DENTAL health programs are much discussed subjects in public health and educational circles today. The old concept of "letting baby teeth alone until they drop out" regardless of their condition is fast losing its place in the minds of the laity. This is due to education and public health programs, which have adopted the new creed, evolved through dental research, that infection in the teeth, either the baby set or the permanent set, must be eradicated in order to maintain the general health of the body. The sooner that disorders in the teeth are corrected, the better for the patient, because the spread of decay is thus checked and the permanent teeth have a better chance to establish themselves so that they can serve their purpose fully during an entire life span.

We know that every tooth begins its life in sound condition. We also know that the length of time this condition is maintained varies greatly in point of age, race and care. As yet, dental research has found no specific cause for dental caries. All we can do at the present time is to observe carefully and, when caries occurs, treat the condition. Naturally, the time to begin this vigil is when the patient gets his first teeth. From then on, there is a constant fight between dental science and dental caries. This fight is waged on four fronts: nutrition, hygiene, periodic dental examination and dental care. All this adds up to the latest specialty in the practice of dentistry, namely preventive dentistry.

It is not easy to solve the problem of preventive dentistry because many factors must be taken into consideration, such as the environmental, personal and economic. The latest conclusion from dental study and research is that:

1. Decay is active throughout life so long as teeth are retained.

2. The extent of its incidence cannot be predicted where neglect in regular dental care from early childhood has prevailed.

3. An unhealthy mouth infects food and produces conditions conducive to disease.

4. The greatest single reason for lack of adequate dental care is economic.

Various attempts are being made today to cope with this situation, one of which is public health dentistry instituted within public educational systems. The City of Palo Alto has been one of the pioneers on this frontier for the past twenty years. Since no definite scheme is followed either nationally or locally, our records cannot very well be compared with similar programs elsewhere.

*Director.

The following facts concerning the activities of this department in Palo Alto for the past school year are set down with the purpose of showing what, and how much, has been accomplished in this field. It is hoped that the results of this program will be described in terms sufficiently clear to give an accurate impression of the type of work carried on by this department.

DENTAL HEALTH PROGRAM IN PALO ALTO

The dental health program in the public school system of Palo Alto incorporates the three essentials in any well-established program of this nature:

1. *Dental Health Education.*—Informal discussions are carried on in the clinic with the patients about the purpose of care of teeth. Movies pertinent to dental health problems are shown the classes and care of the teeth is taught in conjunction with the hygiene classes.

2. *Dental Examination.*—Examinations are held annually and are conducted without charge in all classes from kindergarten through the senior high school. A mouth mirror and sharp explorer are used. The examination is made by the school dentist. Permanent records are kept of the students examined. Reports of defects are sent to the parents with the recommendation that they either have the corrections made by their own dentist or arrange to have the child cared for at the school clinic. There were 810 such notices sent out this year. Out of an enrollment of 3,121 students in the entire school system, we examined 2,825 boys and girls. We found that 2,009 of those examined had no visible defects. This constitutes a 71 per cent dental health ratio for Palo Alto school children, which is unusually high when compared to other outside reports stating that nine out of ten children need dental treatment.

3. *Dental Service.* — This service is available to all students in the Palo Alto public schools who desire it. A nominal fee is charged to those who can afford it. Those who cannot are cared for without charge. Operative work only is performed at the clinic. This consists of fillings of silicates and amalgams, treatment for abscessed teeth, minor extractions and prophylaxis.

What is the effect, if any, on private practice when a program of such scope is carried on in a public school system?

The only answer to that question is that, for the past fifteen years, the percentage of increase in the number of private practicing dentists is twice the percentage of increase in population.

DENTAL HEALTH

Dental health may be defined as that oral condition in which no infection is present on any of the surfaces of the deciduous or permanent teeth. Teeth that have suffered from dental caries but have been repaired with fillings that are in good condition would be classified as healthy. Therefore, any mouth that is immune to dental caries, or any mouth in which decayed teeth have been properly filled or cared for in such a way as to rid the mouth of infection, may be considered 100 per cent healthy. A slight dentofacial deformity existing in a healthy mouth does not alter its condition.

After examining 90 per cent of the entire school and finding, without the aid of the x-rays, that, out of the total of 2,825 students, 2,009 had no visible defects, we can say that 71 per cent had healthy mouths. Very little rise in the percentage of dental health was made over the preceding year—only 1 per cent. The principal reason that so little gain is made is the fact that almost half of the students having poor teeth were new to our school system. This group numbered 44 per cent of those with mouths checked as being in poor condition. (Mouths having two or more infected teeth in varying stages of decay are said to be in poor condition.) The rest of those comprising

the group of students with poor teeth had been in our school system no more than three years.

In view of the fact that it is impossible to maintain a student body control in any public school system, and that all students are checked on the present condition of their mouths rather than on their degree of dental health, there will not be an increase in percentage of dental health of any consequence until all children throughout the nation receive dental care and guidance in the care of the teeth through the growing period of their lives. The main project before us in Palo Alto from now on will be to maintain the dental health at its present high rating.

Looking at the condition of the teeth from the point of numbers, we found that the defective teeth in both the deciduous and the permanent set totaled only 1,801. This number included teeth with small pit cavities, those with large cavities, some with visible abscesses and others so badly broken down that extraction was necessary. The per capita incidence of these defective teeth was 0.64. We use this item in checking because it is pretty generally understood in dental circles. It means little to the average person, who has no comparable figures to balance the foregoing statement, but in looking over similar facts in other communities, we find the per capita incidence of defective teeth as high as 3 or 4. Our first per capita figures taken from the examinations of Palo Alto school children in 1920 were 4.35 per person; so that, in review, a per capita figure of 0.64 defective teeth is considerably less as a dental health quotient.

CLIENTELE

Any student in the public schools of this city is eligible for dental work offered by the school dental clinic. An attempt is first made to place the prospective patient in a private practice, but if, for various reasons, this cannot be done, no child need feel the "social sting" so often associated with treatment at the clinic.

The clientele comprises 11 per cent of the entire school enrolment. This indicates that, with the high dental health percentage, which is 71 for this year, the majority of the students are under the care of private practice. In round numbers, this 11 per cent means 358 boys and girls who, in all probability, would have done without dental care or, at best, would have received only limited care had Palo Alto not been able to offer them this outstanding service. While, in comparison with the whole school population, this number is small, 358 potential citizens are too great a group to be ignored dentally speaking just because they do not fit economically into a private practice. At the same time, this number is too large to be absorbed in private practice without payment of their just obligation to the dentists. Therefore, it is easy to see that the purpose of public health dentistry is dual in character and that its benefits are twofold.

One third of the clientele was unable to pay even our clinical fee. These patients were fully cared for by this department. Any expense incurred by the school dental clinic in its capacity of watchdog for the teeth of Palo Alto school children is more than offset by the fact that there are almost no absences from toothache. And this in turn saves money for the school district.

IMMUNITY

While dental health implies health of all the teeth, whether repaired or not, immunity considers only those mouths having all teeth present and free from infection at the time that they are examined. We are becoming more and more interested in the few who never have to have teeth filled, while others, with all due caution, cannot keep their teeth free from decay. This remains a mystery today even in the professional

circles that are expending time, effort and money to find the answer. We have learned, however, that proper diet and care do have a favorable effect on the average mouth. On this basis, a steady improvement has been noted in the percentage of immunity in the Palo Alto student body. Our examinations are made without the use of the x-rays, yet, in keeping permanent records for our students, we find that, year after year, no defects are noted on the teeth of a certain few. The accompanying tables add encouragement to an extensive project which needs to feel that it is on the right track even if it is moving slowly.

We note many interesting facts concerning teeth, but, to date, it is impossible to give the answers to the "whys" and "wherefores" of our statements. The following deductions are set down for what they may be worth.

TABLE 1.—PROGRESS OF IMMUNITY, ELEMENTARY GROUP

Year	Total No. Examined	Total No. Immune	Percentage of Immunity
1928	1,458	171	11.6
1929	1,707	283	16.6
1930	1,906	371	19.5
1931	1,981	323	16.3
1932	1,839	380	20.7
1933	1,888	453	24.5
1934	1,595	355	22.3
1935	1,786	440	24.6
1936	1,927	587	30.5
1937	2,119	506	23.9
1938	2,825	714	25.2

1. *Do boys or girls have the better teeth?*

The percentage of teeth immune from decay is slightly higher in boys than in girls.

2. *Which tooth shows the greatest immunity from decay?*

The cuspid tooth in the permanent set shows the greatest immunity from decay.

3. *Which tooth shows the greatest susceptibility to decay?*

The first permanent molar is most commonly affected. In practically all cases, if this molar escapes infection, the remainder of the teeth do also. Therefore, this particular tooth has become a barometer for the general condition of the mouth and teeth.

4. *Is any racial difference noted in decay of these teeth?*

Yes, the yellow race have the poorest teeth, the white next best and the black the best.

5. *How does immunity vary with age groups?*

In making up four groups of students from 5 to 7 years of age inclusive as Group I; 8 to 10 years as Group II; 11 to 13 years as Group III; 14 to 20 years as Group IV, we find the percentage of immunity as follows: Group I, 50 per cent; II, 29 per cent; III, 22 per cent, and IV, 15 per cent.

IRREGULAR TEETH

Teeth are said to be regular when they are set in a normally straight line beside their neighbors and, at the same time, meet the opposing teeth in a natural interlocking bite. Irregularity would, of course, be contrary to the normal.

One out of every five students examined had irregular teeth. In the majority of these cases, treatment should be instituted in order to assure the child normal mastication, improvement in facial form and greater phonetic ability. With public consciousness of the dental appearance increasing with the years, the child who grows to adulthood today with a definite handicap from his teeth suffers both in social and in business relations. The chief reason that treatment for this malformity is not started is, again, economic. The cost is to these families prohibitive.

A small fee is charged for dental service performed at the clinic. This ranges from $0.50 to $3.00 per operation and depends on the type of work and restoration needed.

The aggregate charge made for dental service rendered by the clinic was $1,082.50. This makes an average of $0.89 per visit. The charges made by

this department meet only about a quarter of its full maintenance cost. The rest is paid out of the school budget. The money collected by the clinic is paid into the school fund. Altogether, this school district pays less than 1 per cent of its expended dollar for educational purposes to maintain this department for its school children. Palo Alto cared for the teeth of 124 students at an estimated total cost of $326.50, $2.92 per student.

TABLE 2.—DATA FROM FALL EXAMINATION 1938

Permanent Teeth

Girls

	Right Teeth								Left Teeth							
	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
Cavities	0	107	139	13	8	2	9	29	29	15	2	11	23	141	98	1
Extractions	0	3	39	4			1			1	1	1	4	46	2	
Abscesses																

Boys

	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
Cavities	0	73	159	14	4	2	10	12	12	13	3	6	14	157	76	0
Extractions	0	1	37	1	2		2	4	2			4	2	48	3	0
Abscesses																

Deciduous Teeth

Girls

	E	D	C	B	A	A	B	C	D	E
Cavities	76	65	4					4	55	82
Extractions	21	15	1			1	1	1	18	2
Abscesses		1				1				2

Boys

	E	D	C	B	A	A	B	C	D	E
Cavities	95	68	3					6	67	94
Extractions	24	21	1					1	22	26
Abscesses	2									3

SUMMARY VIA "SIX-YEAR MOLAR INDEX"[1]

When a progressive city like Palo Alto spends money for the establishment and maintenance of such a department within its school system as this school dental clinic, is it getting value received for this expenditure? Is there any comparable way to evaluate a dental health program for children?

In the first place, most people today realize the value in dollars and comfort of a healthy set of teeth. Ordinarily, every normal person starts out with teeth 100 per cent healthy. But the vast majority enjoy this experience only one or two years; for about the time a child is 4 years of age, the teeth start to decay in nine out of ten cases. From then on, it is a fight to the finish as to whether we keep our teeth or let the germs carry them off bit by bit.

Since the first permanent molar is of all the teeth most susceptible to decay, it is used as a barometer for the general condition of the other teeth. If this molar can be maintained in the mouth in a healthy condition, we can conclude that the rest of the teeth are, generally speaking, in good condition. If it is lost, the mouth has suffered extensively from decay. For this reason, it is believed that dental health programs can be fairly well

1. Evaluation of Dental Programs for Children, by J. M. Wisan.

evaluated by checking the number of lost first permanent molars per hundred children. The age group used in testing is 12-14 years. This group is selected because twenty-eight permanent teeth should be present and the first permanent molars have been in place for from six to eight years. The students of this age group have presumably had seven or eight years of dental health training. Two questions are considered in making this check: 1. How many molars require extraction? 2. How many molars have already been extracted? Therefore, in evaluating dental health by lost first permanent molars, those that should be extracted are counted with those that have been lost.

Our records show that the number of lost first permanent molars per hundred children was 6. This is the lowest figure that I have seen. A challenge is hereby made to any reader to give information as to the existence of a better record anywhere else in the United States. This challenge is not made in a spirit of boastfulness, but rather in a spirit of competition. The better the records produced, the nearer the attainment of that objective enunciated by the White House Conference on Child Health and Protection: "The retention of the permanent teeth, sound and healthy, functioning adequately and with comfort" for every child.

TABLE 3.—DAY-BY-DAY RECORDINGS

Visits by Schools	
High school	245
David Starr Jordan	322
Addison	182
Channing	99
Lytton	114
Mayfield	97
Purissima	26
Sherman	76
South Palo Alto	63
Stanford	39
Walter Hays	87
Miscellaneous	11
Preschool	21
Total	1,382

Classification of Patients	
Old Cases	159
Boys	74
Girls	85
New Cases	129
Boys	63
Girls	66
Visits	
Boys	697
Girls	685
Total	1,382

Operative Record of Deciduous Teeth	
Amalgam (silver) fillings	253
Silicate (cement) fillings	8
Pulp capping	31
Extractions	89
Total	381

Operative Record of Permanent Teeth	
Amalgam (silver) fillings	253
Silicate (cement) fillings	216
Pulp capping	15
Extractions	1
Total	485

Totals:	
Prophylaxis treatments	312
Treatments for pulp infections, etc.	59
Preparation of teeth for fillings	194
Polishing and finishing work on fillings	23
Examinations made at the clinic	28
Total	616
Grand total of all operative work in the dental chair	1,482
Total increase over 1937-1938	100

RECOMMENDATIONS

The chief recommendation is that we

work out some plan whereby all children have the teeth x-rayed every four years in the elementary grades and every two years in the secondary grades.

Secondly, some movement should be started whereby those students badly needing orthodontic care will be able to get this treatment either at a cost they can meet or, in suitable cases, a cost that will be met for them.

CONCLUSION

While dental supervision should begin the first year of a child's life, I have never seen dental caries in a child under 2 years of age. With sixteen years' experience, examining on the average 3,000 mouths per year, and not noting a case of caries in a child under 2 years, it is safe to admit that, except in rare cases, all children younger than this are free from dental defects. Fairly reliable figures estimate that we have in the United States 42,700,000 children between the ages of 2 to 19 years who should have regular dental supervision. The percentage that is actually getting this care is negligible or we would not find nine out of ten children with dental caries. This is a fact where no attempt is made to set up dental health programs in schools or public health work.

With so much mass need for dental care throughout the country one wonders why more attention is not given to this pressing need. Why is it that the public, the fathers and mothers of this 42,700,000 group of children, the educators who meet them in massed groups daily and the medical, dental and public health workers do not raise their voices in unison for relief and freedom from the poverty of poor teeth and sick bodies? A child is never the picture of health if his lips screen a mouth full of decayed teeth with jagged surfaces and gums oozing pus. There are many reasons why teeth should be cared for during these growing years, but the most important one is that every bit of food passing into a child's body does so via the teeth. It goes on down into his stomach whether those teeth it has been handled by and passed over are good, hard, white, sound and clean surfaced or are jagged-edged, crumbling and black surfaced teeth in pus-containing saliva.

While the picture of dental conditions in one-third of our population looks dark, it is not so dark as it was a quarter of a century ago. A small percentage of this group is being cared for with varying degrees of success by local authorities. Some states are doing more of this work than others, but wherever an attempt is being made to guard the health of teeth, reports indicate an appreciable improvement in children's mouths over reports from those communities that have not made this attempt. Therefore, although we do not know a preventive of dental caries, we do know that constant vigilance over children's mouths will reduce infection to a negligible quantity and prevent destruction of the teeth. There is no denying the fact that Nature intended us to complete our span of life with a full complement of healthy permanent teeth following a full complement of healthy baby teeth. Man has defeated her plan during the process of so-called civilization.

As far as can be determined, the major conditions working against mass dental supervision of our youth are civic complacency and economic deficiencies.

Civic complacency maintains itself because defective teeth in their early stages do not make an impression on any one but the dental inspector or an alert mother. These teeth do not ache, and their condition cannot be observed at this stage as ordinarily a curvature of the spine, faulty posture, flat feet or a skin or scalp disorder can be noted. There is more to the adage that seeing is believing than mere words. When mothers do bring their children to the dentist, their concern is usually for a slight stain or blemish on the front teeth,

which, more often than not, is of minor consequence. When the child's mouth is opened, the posterior teeth evidence the need for immediate treatment. The mother is amazed. Why? Because she has not been able to see that part of her child's dental equipment. And so, unless the mother is alert, an infected tooth goes from bad to worse until it sets up its own howl in the form of severe aching.

As for civic complacency, we can sum it up with that time worn phrase "Let George do it." The very prevalence of decayed teeth is in itself a handicap to general improvement. The majority in a commonwealth are so inured to the thought that teeth are bound to decay that they cannot readily grasp the counter thought that teeth are bound to decay *unless*—. Then when professional leaders denounce a plan which includes mass care of children's teeth because it will block private enterprise, the public forgets that during the many years such health measures have been withheld we still have had 90 per cent of the nation's boys and girls suffering needlessly for want of dental care, and that, on the other hand, private enterprise has benefited wherever broad attempts have been made to teach and to control dental health for school children.

A democracy is built on the principle of the greatest good for the greatest number of people. In no instance can this principle be more aptly applied than in dentistry for school children.

THE FIRST INTERNATIONAL EXPOSITION OF EDUCATIONAL CINEMATOGRAPHY

THE contribution that educational motion pictures can make to the improvement of cultural relations and to the development of a "Good Neighbor" policy on a basis of popular sympathy and understanding is apparent in reports of the First South American International Exposition of Educational Cinematography held in Buenos Aires, June 10-20, 1939.

Thirteen nations participated in the exposition. Films from the United States and Germany were displayed in greatest number. Submitted for exhibit were more than sixty films from five United States government bureaus, four national associations or institutions, five national industries, five educational film producers or distributors and two institutions. Twenty-five films were submitted from Germany. A total of 147 films from all countries were submitted for display.

The American pictures which created most interest were "Flowers at Work," of Erpi Classroom Films, which was scored in Spanish especially for this exposition; "How You See" and "How We Hear," of Bray Pictures; "Clouds" and "The Cicada," of the United States Department of Agriculture; "The Quest of the Alaska Sealskin," of the Fouke Fur Company, and the two films on dental health, "Care of the Teeth" and "The Road to Health and Happiness," which were sent in by the American Dental Association.

DENTAL ECONOMICS

A SURVEY OF MOUTH HYGIENE PROGRAMS FOR SCHOOL CHILDREN

A SURVEY of mouth hygiene programs for school children has recently been made by the Cleveland Child Health Association. The material was prepared by Harris C. Wilson and Mrs. Ella Greene, with the advice of the dental committee, officers and director of the Cleveland Child Health Association. The report has been published in five sections, each section dealing with cities of a particular size.

Summaries are presented here of some of the information about the agencies in charge of the programs, the type of personnel making dental inspections and financial examinations and the facilities for providing free and part-pay service to children whose parents are unable to pay for private care. A complete understanding of the information contained in the survey can be obtained only from a study of the entire report.

The administration of the school mouth hygiene program in the majority of these thirteen largest cities of the United States, Los Angeles, San Francisco, Chicago, Baltimore, Boston, Detroit, St. Louis, Buffalo, New York City, Cleveland, Philadelphia, Pittsburgh and Milwaukee, is vested in the department of health, as is shown in Table 1.

In nine of the cities definite provisions are made for dental health education in the classrooms.

The type of personnel responsible for school dental inspections covered a wide range. Dentists made all of the inspections in only three of the cities. In a fourth city, dentists made the inspections in the parochial schools only. The personnel for all of the cities is indicated in Table 2.

TABLE 1.—ADMINISTRATION OF SCHOOL PROGRAM

No. of Cities	Administration
6	Department of health
4	School department or board of education
1	Shared by health department and school department
1	Shared by health department and private foundation
1	Private foundation
13	

The survey shows that all of the cities make some provision for dental care, although none of them is able to meet completely the need for indigent service. In ten cities, clinic services are provided by the health department and, in the other three cities, by the school department or boards of education. Hospital dental clinics assume part of the burden in eight of the cities and private philanthropic organizations and foundations in at least nine of the cities.

In the field of part-pay or low-cost dental care, provisions are more limited. Two cities recorded no facilities for such care. In eight cities, dental schools serve

a limited number of patients and these are mainly adults. In some of the cities, dental clinics connected with hospitals are the only source of part-pay service.

CITIES OF FROM 150,000 TO 500,000 POPULATION

There are thirty-eight cities in the United States in the 150,000-500,000 population group. In all but one, there is a program of mouth hygiene education or service for children, although the extent of the programs varies greatly.

The responsibility for the administration of the program is vested in the agencies listed in Table 3.

In a majority of the cities (twenty), a dentist is responsible for the active direction of the program. Physicians rank next in number (eleven cities). In the majority of the cities, dental examinations of school children are made by persons other than dentists.

The wide variation of the type of personnel making these inspections can be observed in Table 4.

TABLE 2.—PERSONNEL OF ALL CITIES

No. of Cities	Type of Personnel
3	Dentists (Chicago, Detroit, Cleveland)
2	Dental hygienists (New York, Milwaukee)
2	Physicians (St. Louis, Philadelphia)
1	Physician in public schools, dentist in parochial (Boston)
1	Physician and dental hygienist (San Francisco)
1	Physician and occasionally school nurse (Los Angeles)
1	Medical inspector (Pittsburgh)
1	Health officer (Baltimore)
1	"Preventive program practically discontinued" (Buffalo)
13	

TABLE 3.—AGENCIES ADMINISTERING PROGRAMS

No. of Cities	Administration
24	Department of schools
9	Department of health
2	Shared by school and health
1	Dental foundation
1	Dental society
1	No program
38	

TABLE 4.—VARIATIONS IN INSPECTION PERSONNEL

No. of Cities	Dental Inspection Personnel
8	Dentist
5	Nurse
4	Dental hygienist
4	Dentist and dental hygienist
3	Physician and nurse
2	Physician
2	Dentist and nurse
1	Teacher
1	Dentist, dental hygienist and nurse
1	Dental hygienist and nurse
1	Physician, nurse and teacher
1	No program
1	No answer
38	

In the majority of these cities, there are some facilities for part-pay and free service. In most cases, the financial standing of the family is investigated before the child is referred for service. This is frequently done by the nurse working in cooperation with other members of the personnel. Table 5 indicates the personnel used for making financial ratings.

Table 5.—Personnel for Financial Ratings

No. of Cities	Personnel Making Financial Investigations
22	Nurse
9	Principal
6	Teacher
6	Social agency
3	Dental hygienist
2	Social worker
1	Physician
1	Dentist

Table 6.—Administraton of Programs

No. of Cities	Administration
58	School department
23	Health department
3	School and health department
1	Dental society (Galveston, Texas)
1	No answer
11	No program

Table 7.—Personnel Making Inspections

No. of Cities	Personnel
26	Dentist
14	Dental hygienist
11	Nurses
9	Physicians
8	Physician and nurse
6	Dentist and dental hygienist
5	Dentist, physician, nurses
2	Dentist and physician
1	Dentist, dental hygienist, physician
1	Teacher and nurse
1	No routine inspection
1	No answer

There is a wide range in facilities provided for the correction of defects. The survey shows that, in cities of this size, the clinics giving free service are far more numerous and better organized than low-cost or part-pay clinics. Only seven of the cities mentioned part-pay facilities, while all of them mentioned provision for children whose parents can pay nothing for dental service. Some of them offer a wide range of service and others are limited to a few types of operations.

Many of the cities have definite dental health education programs in connection with their hygiene programs, but these it is not possible to summarize, and they are described in the individual descriptions of the city programs.

Cities of from 50,000 to 100,000 Population

A summary of the mouth hygiene programs in the ninety-eight cities in the 50,000-100,000 population group shows that, in the great majority of these cities, the administration of the program is in the hands of the school department. (Table 6.)

There is a great variation in the com-

bination of personnel employed to make dental inspections. In the majority of the cities, dentists take no part in the inspection. However, dentists and dental hygienists together make the inspections in a majority of the cities. (Table 7.)

The survey states that seventy-five of the cities carry out some type of mouth hygiene education and that, in the majority of cases, it is part of the hygiene curriculum and is taught by the classroom teacher, dental hygienist or teacher and hygienist or teacher and nurse together, with occasional lectures by a dentist.

Table 8.—Financial Investigations

No. of Cities	Investigator
62	Nurse
25	Principals or teachers
19	Social service, welfare and charity departments
16	Dental hygienist
8	Dentist
1	Physician

Table 9.—Governmental Agency Administering Program

No. of Cities	Administration
87	School department
38	Health department
11	Some other agency
47	No definite reply

Table 10.—Inspection Personnel

No. of Cities	Personnel
51	Dentist
26	Dental hygienist
20	Physician
45	Nurse
41	Two or more of the health staff
1	Teachers

All but four of the cities reported some free remedial dental service available to school children. Only fifteen reported organized part-pay programs. In the majority of the cities, financial investigations are made by the school nurses before referral for free care. In the other cities, they are made by various persons such as principals, teachers, social agencies, hygienists, dentists and physicians.

The available clinic services vary greatly among the cities. Some cities have only one or two chairs in operation a few hours a week. Other cities have clinics which offer a wide range of service. Still others are limited to a few operations. The survey contains a tabulation of the many types of service programs in these ninety-eight cities. This section concludes with the following interesting comment:

> In conclusion, it may be stated that the dental programs in this group of cities have been very difficult to summarize, as there are almost as many variations as there are cities. A few cities recognize mouth health as a major health problem, but in many places official agencies have assumed little responsibility, financial or otherwise, for the care of school children's teeth. In almost all cities, private and public agencies are active in the dental programs. State laws are barriers to dental programs in some places. An encouraging sign is the number of cities stating that their dental programs are in the state of reorganization.

The financial rating of parents who claim inability to pay professional fees for the care of their children is in-

vestigated as indicated in Table 8.

For those children who are entitled to free service as determined by the investigation, the different cities provide a wide variety of facilities. Free service is available in fifty-six of the 179 cities. Part-pay clinical service is available in eighteen other cities, but information was not submitted concerning the amount of the fee.

For the purpose of this survey, part-pay clinics were considered to be those clinics which charged not less than 25 cents per visit. There are clinics of this type under the supervision of the schools in eleven cities and under the health department in six cities. In seventeen cities, there is part-pay service available in private offices. One hundred and nineteen of the cities made no answer to the question; which probably indicated that no part-pay service was available.

CITIES OF FROM 25,000 TO 50,000 POPULATION

There are 179 cities in the 25,000-50,000 group and the survey covers the 172 which submitted information in response to the questionnaire. In respect to the question as to which governmental agency administers the mouth hygiene program, replies were received as shown in Table 9.

With respect to the personnel making the dental inspections, there is the same wide variation as revealed in the other sections of the report. (Table 10.)

Educational programs are presented in nearly all of the cities, and the methods employed vary in respect to the background and training of the person in charge. The methods most frequently employed are movies, honor rolls, demonstrations, posters, lectures and talks. Usually, more than one method is used by a city.

PRACTICE IN PARAGRAPHS

This department is intended for busy readers. It aims to tell a vivid story in a few words. Items should be of a practical character, and free from padding—not more than a paragraph or two. We exact no limit, but two hundred words can tell most of these stories. Send in your ideas; they will be welcome.

Silver Nitrate Applicator—Dr. Clark's method of applying silver nitrate (J. A.D.A., 26:1227, July 1939) is ingenious. A liquid solution is used. There is, however, another manner by which even very small, almost inaccessible areas can be reached.

Cut off head from a brass pin, bend to bayonet form and insert in a broach holder. Heat the end and dip it into powdered crystals of silver nitrate. Some of these will adhere. Pass the end again through the flame to melt the silver nitrate to form a thin coating on the pin. Pass the pin lightly over the area to be treated. The slight amount of moisture present (saliva or water) will dissolve sufficient silver nitrate.

The field need not be isolated, nor need a reducing agent be used as the silver nitrate will combine immediately, leaving no free reagent to harm surrounding tissues. The pin should then be burned off immediately so that silver nitrate does not soil the fingers or linen.

I note that this method is also advo-

cated by Dr. Orban in his recent article (J.A.D.A., 26:1276, August 1939).

Simple Technic for Obtaining Better Gingival Margins by the Direct Inlay Method in Compound Cavities of Molars and Bicuspids—The cavity is prepared in the usual manner. A matrix band is placed around the tooth and the heated inlay wax is forced into the cavity with considerable pressure. The surplus wax is trimmed to conform roughly to the bite. A stick of inlay wax is warmed slightly at the end and a wedge-shaped piece of wax is cut from the stick. This can be done best with a razor blade.

The sharp end of a long pointed instrument, preferably an old explorer, is trimmed off and heated in the bunsen flame, and the inlay wax is softened until that around the gingival margin is soft. Now, the sharp end of the wedge-shaped piece of inlay wax previously cut is plunged into the softened wax. When the wax is chilled, the surplus of wedge is cut off and the wax is trimmed to occlusion. The matrix band is now removed. When the wax pattern is removed from the tooth, there will be a definite, well-defined margin gingivally. —*S. J. Fischer, 34 Court St., Binghamton, N. Y.*

Precautionary Measures in the Extraction of Superior Third Molars—Too often, even the experienced exodontist is apt to be hasty when extracting a fully erupted upper third molar, since he knows that, as a rule, the roots of that particular tooth are stubby and compact and the process in that region of the maxilla "gives" quite readily. In other words, a very simple extraction case presents itself. However, to his deep dismay, he may inject too deeply and "infiltrate" into a vein, causing ballooning of the cheek, which, in turn, may cause severe buccal discoloration attended by discomfiture and worry. He may cause severe pain on removal of the tooth, owing to failure to consider a tooth with partially absorbed roots in his anesthetic technic. Lastly, he may emphasize rotary movement in extracting and thus break off the crown of a fully defined three-rooted molar with long, narrow roots, and then he is in real trouble; for the superior third molar region is generally a pretty difficult area in which to use elevators or forceps when the adjacent second molar is present.

Therefore, it is advisable to inject cautiously and not too deeply; to infiltrate the gingival tissues as well as possible, and to emphasize buccodistal pressure, along with slight backward torsion rather than rotation, to eliminate the possibility of unnecessary difficulty in upper molar extractions.—*G. Sidney Jacks, 4125 West Montrose Ave., Chicago, Ill.*

Pressure Anesthesia—A vital tooth can be devitalized easily by the following method. Dissolve a small amount of procaine powder on a small piece of cotton moistened with a sterile physiologic sodium chloride solution. Place this in the cavity and cover it with a small piece of unvulcanized rubber. An amalgam plugger is then used to press on the rubber, which acts as a plunger, sending the procaine solution into the root canal.—*David Waldman, D.D.S., 1112 DeKalb Ave., Brooklyn, N. Y.*

Impression Tray—A rigid tray for impressions can be made quickly and inexpensively by utilizing discarded phonograph records. A Bunsen flame is played on the phonograph record to soften it. The record is then adapted against the cast by pressing upon it with a wet towel. A handle can be made by searing a rolled piece of record against the tray with a hot plastic instrument. The periphery can be trimmed with a hot plastic instrument or sandpaper cones mounted on a chuck. —*David Waldman, D.D.S., 1112 DeKalb Ave., Brooklyn, N. Y.*

CURRENT LITERATURE

Human Saliva. VII. A Study of Rate of Flow of Resting Saliva

By Hermann Becks

Stimulation of the salivary glands results in an increased rate of salivary flow and a consequent change in the chemical composition. It is necessary, therefore, to consider the rate of flow in any study of saliva, either "resting" or "activated."

Over a two-year period, the rate of flow of resting saliva fluctuates an average of 5.4 cc. per hour for twenty individuals secreting less than 20 cc. per hour; and 24.6 cc. per hour for twenty secreting more than 20 cc. per hour. For samples taken on five successive days, the fluctuation was less for both groups (4.5 cc. and 15.9 cc. per hour respectively). The lower the initial rate of flow, the greater the fluctuation during two and one-half hours of continuous stimulation.—*J. D. Res.*, **18**:431, October 1939.

Martin Deakins.

Human Saliva. VIII. A Study of Rate of Flow of Activated Saliva

By W. W. Wainwright

Saliva activated by paraffin chewing has a higher rate of flow and greater fluctuation, but the difference between the slow and rapid groups is much less. Continuous stimulation increased the fluctuation even more and further decreased the difference between the two groups.—*J. D. Res.*, **18**:441, October 1939.

Martin Deakins.

Human Saliva. IX. The Effect of Activation on Salivary Flow

By Hermann Becks and W. W. Wainwright

Paraffin stimulation increased the average output of fifteen members of group I (slow) 185 per cent and that of fifteen members of group II (rapid) only 129 per cent. This difference between the two groups remains after eight successive intervals of stimulation. However, the actual rate (cubic centimeters per hour) is nearly the same in both groups during stimulation. The high percentage difference is due to the different rates of flow during rest.—*J. D. Res.*, **18**:447, October 1939.

Martin Deakins.

Ueber des Vorkommen der Lingua Plicata (Feltenzunge) (The Occurrence of Lingua Plicata [Folded Tongue])

By F. Rolleri

Of 3,113 school children, 102 were found to have a condition of the tongue that the author believed to be typical lingua plicata. Twenty per cent of the affected children were mentally immature. This tongue condition proved to be common in an institution for mentally deficient children.

In 400 children under 4 years of age, no case of lingua plicata was found. In children over 11 years, the incidence was decidedly higher. In 67 per cent of cases, the tongue affection was accompanied by other regional malformation, hyperplasia of the adenoids, high palate, prognathism, cleft of the uvula, etc. In a third of the cases, skin diseases were noted.—*Ztschr. f. Menschl. Vererb. u. Konstit.*, **23**:287, 1939.

R. F. Sognnaes.

Oral Pathology [Pathosis] in Monkeys in Various Experimental Dietary Deficiencies

By T. H. Tomlinson, Jr.

Topping and Fraser (The Journal, **26**: 843, May 1939) have stated the objectives and outlined the methods of procedure followed in their experiment. This paper reports the oral condition found in the thirty-nine *Macacus rhesus* monkeys on diets deficient in certain vitamins observed in their study. The epithelial attachment showed some alteration in most of the animals, varying from slight focal thickening to complete necrosis. However, six monkeys showed no changes in any of the sections examined except cellular infiltration of the free gingiva.

Blood pigment or hemorrhage was present, and occasionally both, in sections from all of the C deficiency cases, one of the D deficiency, one of the flavin deficiency, and one of the groups on B_2 complex deficiency plus flavin and nicotinic acid. Necrosis of the periodontal tissues and oral mucosa occurred to a varying extent, qualitatively similar in the B_2 complex deficiencies with variations in the flavin and nicotinic acid factors, in the C deficiency and in the D deficiency, and probably greatest in extent in the B_2 deficient groups.—*Pub. Health Rep.*, 54:431, March 17, 1939.

VIRGIL D. CHEYNE.

Factors in Saliva Correlated with Dental Caries

By MAXWELL KARSHAN

THE author's previous investigations of the relationship between the chemical properties of the saliva and dental caries have been extended by further work with stimulated saliva and by analyses of unstimulated saliva from patients with different degrees of caries activity. In both stimulated and unstimulated saliva, the carbon dioxide capacity, total calcium, inorganic phosphorus and loss of carbon dioxide to tricalcium phosphate were significantly greater in the caries-free groups. In stimulated saliva, the loss of phosphorus protein to tricalcium phosphate and the total protein was greater in the active-caries group. No real differences were found in protein content or phosphorus loss in unstimulated saliva. The findings in an arrested-caries group followed these in the caries-free group, and those for a group showing variable caries susceptibility fell between the caries-free and caries-active groups. "The findings indicate that the saliva of persons free from dental caries would protect enamel against solution by acids to a greater extent than would the saliva of persons with active decay."—*J. D. Res.*, 18:395, 1939.

B. G. BIBBY.

Studies on the Pathogenicity and Cytological Reactions of the Submaxillary Gland Virus of the Guinea-Pig

By C. T. ROSENBUSCH and A. M. LUCAS

THE authors present a comprehensive report on a strain of submaxillary gland virus which they found in guinea-pigs. The strain was particularly virulent, causing death in all animals injected with the regular dosage, regardless of the site. Upon the basis of survival time comparisons, it appeared that colonies of animals which furnished the virus were slightly more resistant than animals of the same age taken from an unexposed colony. In general, it appeared that young guinea-pigs were more resistant.

The principal histopathologic, cytologic symptom was the presence of intranuclear inclusions. These were observed in monocytes, lymphocytes and various parenchymatous cells throughout the body. However, they were most numerous in the submaxillary salivary gland, where they were noted in the gland duct cells or invading monocytes. The inclusions were frequently of two parts, an acidophilic portion and an acidobasophilic portion. Stages of nuclear degeneration are discussed in detail in this connection. The affected cell is autolyzed or there is giant cell formation. Ultracentrifugation of inclusion-bearing cells indicated that the inclusions were lighter than nuclear chromatin, but heavier than the nucleoplasm. This criterion serves to differentiate the virus from herpes. If the animal survived a sublethal inoculation, the severely damaged salivary gland regenerated and mitotic figures could be found.—*Am. J. Path.*, 15:303, May 1939.

VIRGIL D. CHEYNE.

A Digest of the Etiology of Dental Caries: Introducing a New and Original Hypothesis

By CECIL D. HEARMAN

IN an analysis of various theories of the causation of dental caries, while stress is placed on the importance of local factors giving rise to acid production, it is concluded that "in its broadest conception, dental caries should be regarded as a symptom of malnutrition." Point is given to this by the suggestion that in the absence of the catalyzing action of vitamin B_1 (removed from the diet by refinement of cereals), the normal breakdown of pyruvate, formed during carbohydrate fermentation, to carbon chloride and water does not occur and acid is liberated. Gingival decalcification and evasion are explained as the result of the setting free of acid by cells of the gingivae which, be-

cause of the absence of vitamin B_1, are unable to bring about the normal breakdown of intracellular acids.—*D. J. Australia,* 11: 692, November 1, 1939.

B. G. Bibby.

Studies on Chemical Sterilization of Surgical Instruments. 1. A Bacteriological Evaluation

By E. H. Spaulding

Because of the ease and convenience of immersing sharp instruments in a chemical solution for sterilization, Ecker and Smith report that 36 per cent of hospitals which they investigated used this method of disinfection.

Seven solutions were selected, to represent as many different types of products as possible. Eight different bacterial species were selected in the tests. All instruments tested had blades heavily contaminated with pure cultures of bacteria suspended in blood or exudate.

Results of this investigation showed that, with one exception, the non-sporulating organisms failed to survive an exposure of longer than thirty minutes in any of the solutions. However, bacterial spores were highly resistant. Four of the seven solutions were not effective within the time limit used. The formaldehyde-alcohol and the borax-formalin solutions appeared to be the best sporicidal agents of the seven solutions used.—*Surg. Gynec. & Obst.,* 69:738, 1939.

Arthur F. Fisher.

A Comparison of Cereal and Non-Cereal Diets in the Production of Rickets

By J. Jones

Analysis of the effect on calcification and production of rickets in rats from adding various cereals to a basal diet affords support of the view held by Mellanby that cereals contain a specific anti-calcifying factor.

Rolled oats, wheat, yellow corn, dextrinized cornstarch and sucrose were used to supplement a basal diet of alcoholic extracted fibrin, carotene and a salt mixture complete except for calcium and phosphorus. The addition of high calcium (3 per cent calcium carbonate), no phosphorus and rolled oats and wheat resulted in more calcification than the corn or the non-cereal diets. On reduction of calcium to 1 per cent, all the cereal diets showed an increase in calcifying effect. Similar results were obtained when the calcium was omitted entirely.

However, when phosphorus was added to the low-calcium diets, there was no detectable difference in calcification on any of the diets.

Therefore, when phosphorus was the limiting factor, there was a difference in calcification only because the amount of available phosphorus was not the same in each case, since calcium as the limiting factor in the presence of excess phosphate afforded little difference in the calcifying effect.—*J. Nutrition,* 18:507, November 1939.

N. S. Simmons.

Reduction of Experimental Rat Caries by Fluorine

By Harold C. Hodge and Sidney B. Finn

It had been shown earlier by Lilly that substitution of casein for whole milk powder in a caries-producing diet markedly reduced the incidence of caries. Hodge, Luce-Clausen and Brown found commercial casein contaminated with fluorine (0.2 per cent). Since the other constituents of the diet were quite constant, it occurred to the authors of the present report that fluorine might be the factor in the caries reduction. Consequently, one hundred and thirty-five stock rats at weaning age were divided into three groups, littermates being separated and the sexes segregated. The first group of forty-five rats received the caries-producing diet with powdered whole milk. The second group received essentially the same diet with casein substituted for the powdered milk. This casein was "fluorine-free." The third group received the latter diet plus drops of an aqueous solution of potassium fluoride containing 3 mg. of fluorine, daily. The results, at the end of 200 days, showed that the rats receiving powdered milk or casein had about an equal incidence of caries and an equal number of cusps involved. The rats receiving fluorine showed a 60 to 70 per cent decrease in both cavities and cusps involved, as compared to the other two groups. From these findings, it can be concluded that fluorine, not casein, is responsible for the diminished incidence of fractured and carious

teeth.—*Proc. Soc. Exper. Biol. & Med.*, 42: 319, 1939.

VIRGIL D. CHEYNE.

Calcium and Phosphorus Metabolism in Ossifying Fibroma of the Mandible

By K. P. KLASSEN and G. M. CURTIS

THIS is supposed to be the first study of the calcium and phosphorus metabolism in ossifying fibroma of the mandible. A complete balance study on these minerals was performed on a woman, aged 27, with a typical case of the disease.

The calcium-phosphorus balance and phosphorus content, as well as the phosphatase activity of the blood, were found to be within normal limits.

The findings support the view that ossifying fibroma of the jaw does not belong to the group of osteodystrophies arising from faulty mineral metabolism. This is also indicated by the absence of involvement of the skeleton in general.—*J. Bone & Joint Surg.*, 21:444, April 1939.

R. F. SOGNNAES.

Nutrition as a Factor in Periodontal Conditions

By D. MOSHER

THE author gives a brief discussion of the nutritionist's rôle in maintaining the general health which, in turn, is reflected in good oral health. The author states that "the three essential nutritional periodontal requirements are vitamin D, calcium and phosphorus," vitamin C not being mentioned.

If roentgenographic checkup reveals alveolar resorption, a serious functional upset is taking place, requiring a thorough physical examination by an internist, without which local or nutritional therapy may be fruitless. —*Mil. Surgeon*, 85:506, December 1939.

N. S. SIMMONS.

Hyperpyrexia Following Operation for Cleft Lip or Palate

By H. IRISH and C. STEPHEN

THE authors attempt to throw some light on the cause and prevention of the hyperpyrexia that commonly follows operations for cleft palate and harelip. The data are based on seventy-one operations for the correction of cleft palate and twenty-nine for harelip, performed on seventy-three children ranging in age from a few days up to 10 years.

The degree of hyperpyrexia was found to be dependent on age, being lowest in infants operated on before 3 months of age, and highest in those on whom the operation was performed between the ages of 3 and 12 months. The average postoperative temperature in cases of harelip was 101.4° F., and in cleft palate 102.3° F.

Secondary or deferred fever was found less frequent when infection or contagion was prevented by isolation for a period of at least seven days, and when the patients were in the best possible general health. —*Am. J. Child Dis.*, 58:320, September 1939.

R. F. SOGNNAES.

Selecting a Suitable Anesthetic Agent for Exodontia and Oral Surgery

By JAMES R. CAMERON

THE work of operator and anesthetist should be one of cooperation. The progress of oral surgery and anesthesia is slowly but definitely exposing the impossible dual rôle of anesthetist and operator at the chair. The choice between local and general anesthesia in exodontia depends on (1) the physical condition and temperament of the patient; (2) the ability and temperament of the operator; (3) the availability of a trained anesthetist, and (4) the type and extent of the diseased area of operation.

For routine office work, nitrous oxide-oxygen anesthesia is one of choice. This is contra-indicated in plethoric, muscular, athletic or alcoholic patients.

Difficult extraction or oral surgical cases should be hospitalized. The choice of anesthetic is avertin, as a basal anesthetic, supplementing it with nitrous oxide-oxygen or occasionally ether.—*Cur. Res. Anesth. & Analg.*, 18:278, September-October 1939.

WILLIAM J. MANION.

Periodontal Symptoms Associated with Diabetes

By ISADOR HIRSCHFELD

THE author believes there are some definite periodontal symptoms either caused by or intimately associated with diabetes, two such clinical entities being (1) the acute

gingival abscess and (2) the sessile or pedunculated proliferations or polyps protruding from beneath the marginal gingiva.

To illustrate the former, the author cites two selected cases. In the first instance, the patient, who was unaware that she had diabetes, presented a series of gingival abscesses, and tooth mobility, with little pocket formation. The sudden simultaneous development of numerous subgingival abscesses brought to mind the furunculosis frequently associated with diabetes. Four case histories are presented illustrating the subgingival proliferations, with a discussion of the gross morphology of the lesion and its differential diagnosis from lesions associated with pregnancy.

Both types of lesions show a tendency toward spontaneous healing on diabetic therapy only.

It must be borne in mind that these lesions are found in diabetics only occasionally, but, when present, they may suggest the presence of diabetes.—*Mil. Surgeon,* **85**:489, December 1939.

N. S. Simmons.

Chronic Fluorine Intoxication in Domestic Animals

By A. Pierce

Naturally occurring chronic fluorosis in domestic animals has been observed on all the continents except Asia and Australia. However, mottling of the enamel in human teeth has been reported in India, China and Japan. The most obvious symptoms of chronic fluorine intoxication which occur in animals are the dental abnormalities. Manifestations of the disease are often found in cattle grazing in the neighborhood of factories producing superphosphates, hydrofluoric acid, copper, aluminum, etc. Symptoms of the malady includes less rapid growth in the young and loss of weight in mature animals. The most marked changes occur in the bones and teeth, but there is no general agreement as to the influence of continual ingestion of small amounts of fluorine on the actual percentage of ash in the bones and teeth. Other effects of fluorine poisoning include reduced milk and egg production. Sodium fluoride and sodium fluorsilicate are the most toxic fluorine compounds and cryolite and calcium fluoride are the least toxic.—*Nutrition Abstr. & Rev.,* 9:253, October 1939.

J. Volker.

Solubility of Tooth Enamel in Saliva at Various pH Levels

By L. S. Fosdick and A. C. Starke, Jr.

The authors have attempted to study enamel solubility under conditions comparable to those found in the mouth. Varying amounts of lactic acid were added to fresh mixed saliva containing a known amount of powdered enamel. The reaction mixture was then shaken at 38° C. for a period of from twelve to twenty days. At the end of the experimental period, the supernatant liquid was analyzed for calcium, phosphorus and lactic acid. Results indicate that under these experimental conditions the solubility of enamel at pH 7.0 is relatively slight. As the pH decreases, the concentration of calcium and phosphorus ions in solution increases, slowly at first and later very rapidly. The apparent solubility product of enamel in saliva at various pH levels was studied. The values for the ionic product increase rapidly at pH values greater than 6.2. The critical pH at which enamel will dissolve in saliva can be determined.—*J. D. Res.,* **18**:417, October 1939.

J. Volker.

Dangerous Water

By G. Abbott

In 1931, the causative agent was found for the dental lesion "mottled enamel." The presence of fluorides to the extent of a few parts in a million will cause this malady.

"Mottled enamel" is very frequent in many areas, outstanding of which are sections of Texas, Arizona, Colorado and South Dakota. Physiologic research in these areas also showed other pathologic effects, such as alterations of bone structure, thyroid gland enlargement and reduction in calcium content of blood with subsequent body metabolism disturbances.

As yet, no practical method for the removal of fluorides from drinking water has been demonstrated. If rainfall is insufficient in these areas, water should be hauled or shipped from the nearest available supply. —*Hygeia,* 17:899, 1939.

Arthur F. Fisher.

OBITUARIES

THEODORE W. MAVES, D.D.S.
(1888-1939)

DENTISTRY recently suffered the loss of one of its internationally known members in the death of Theodore W. Maves. Death occurred at St. Luke's Hospital, Cleveland, Friday, October 27, after an emergency appendectomy.

THEODORE W. MAVES, D.D.S.

During the years that he devoted to dentistry, Dr. Maves contributed much to the advancement of his profession, both in research and in teaching. Few could equal him as a teacher of crown and bridge work. He was an associate in this department at the University of Minnesota, School of Dentistry, and later headed the same department for three years at the School of Dentistry, Western Reserve University.

Theodore W. Maves was born in St. Peter, Minn., June 2, 1888, and received his early education in that city. He was graduated from the University of Minnesota, School of Dentistry in 1911. In addition to his work as a teacher and lecturer, he served as president of the Minneapolis District Dental Society; president of the Minnesota State Dental Society, and chairman of the Partial Denture Section in 1921. He was founder and first president of the Academy of Restorative Dentistry and during the World War served on the Medical and Dental State Board in Minneapolis. Dr. Maves was also active in the American Medical and Dental Biological Society. He was a member of the Union Club in Cleveland.

Surviving Dr. Maves are his wife, Winifred, two sons, Theodore W., Jr., a student at Western Reserve University, School of Dentistry, and John W., and a brother, O. R. Maves, of St. Peter, Minn.

JOHN EDWARD HINKINS, D.D.S.

DR. HINKINS received his dental degree from the Chicago College of Dental Surgery as a member of the class of 1887. From the time he graduated until he retired a few years ago, he was a tireless worker for organized dentistry. As a reward for his excellent services, he was honored with many offices of distinction. He was past president of the Chicago Dental Society, the Illinois State Dental Society and the Chicago Odontological Society and was frequently chairman of sections and committees of the American Dental Association. He was prominently associated with the organization work of the Third and Fourth International Dental Congress. For years, Dr. Hinkins carried on extensive research work in the chemistry of cements and contributed valuable papers before both national and international societies on the subject.

His spotless character and outstanding career place his name among those who have gone to the great beyond, but who have left a great heritage to dentistry.

C. F. B. STOWELL, D.D.S.
(1873-1939)

C. F. B. STOWELL was born in Rochester, N. Y., July 13, 1873; died on April 23,

1939. In 1885, his parents moved to Mayville, Mich., where he attended grammar and high school. Later, he was appointed superintendent of schools, serving for six years. In 1902, he entered Northwestern University Dental School, which he attended for two years. In 1905, he entered Michigan University, where he received the degree of D.D.S. In 1908, Dr. Stowell returned to Chicago and joined the teaching staff at Northwestern University. He held the chair of assistant professor of comparative anatomy from 1911 to 1914, resigning to open an office in Chicago, where he limited his practice to extraction. In 1933, he retired and returned to Morley, Mich., where he lived until the time of his death.

Dr. Stowell appeared before many dental societies of the country with papers and clinics on anesthesia, exodontia and kindred subjects. He was past president of the Odontographic Society of Chicago, and a member of the American Dental Association, the Illinois State Dental Society, the Chicago Dental Society and the Delta Sigma Delta Fraternity.

Dr. Stowell's geniality and his willingness to work for the good of dentistry and the profession will be held in grateful remembrance.

DEATHS

Anthony, Robert Garfield, Wichita, Kan.; Ohio State University College of Dentistry, 1908; died September 27; aged 58.

Callender, W. B., Port Arthur, Texas; Texas Dental College, 1916; died November 5.

Close, I. E., Roodhouse, Ill.; Northwestern University Dental School, 1907; died July 7; aged 63.

Collins, Gerald W., Vermillion, S. D., University of Michigan School of Dentistry, 1894; died October 22; aged 70.

Conroy, Robert R., Milwaukee, Wis., Milwaukee Medical College, Dental Department, 1901; died August 25; aged 61.

Davern, John, St. Paul, Minn.; Northwestern University Dental School, 1897; died August 21; aged 66.

Dennison, Lee Z., Springfield, Ill.; Washington University School of Dentistry, 1929; died September 29; aged 33.

Frick, Edward S., Philadelphia, Pa.; Temple University School of Dentistry, 1924; died November 5; aged 41.

Gallagher, John C., Evanston, Ill.; Northwestern University Dental School, 1914; died October 17; aged 50.

Hamilton, Harry Watt, Verona, Ky., formerly of Chicago, Ill.; Ohio College of Dental Surgery, 1908; died October 22; aged 52.

Henson, Douglas O., Philadelphia, Pa.; University of Pennsylvania, School of Dentistry, 1906; died recently.

Hill, H. H., Milwaukee, Wis., Chicago College of Dental Surgery, 1912; died August 22.

Hoblitzell, Charles William, Jersey City, N. J.; New York College of Dentistry, 1881; died September 27.

Hovestad, Julius F., Boston, Mass.; Harvard University Dental School, 1904; died September 13.

Ioset, R. F., Long Prairie, Minn.; University of Minnesota, School of Dentistry, 1920; died July 6; aged 43.

Jeffrey, Frederick E., Salem, Mass.; Tufts College Dental School, 1900; died September 11.

King, George William, Detroit, Mich.; Indiana University School of Dentistry, 1911; died October 17; aged 64.

Koetters, Edward F., Quincy, Ill.; University of Illinois College of Dentistry, 1914; died October 22; aged 47.

Lehman, William Harvey, Pontiac, Mich.; Detroit College of Medicine, Department of Dental Surgery, 1902; died August 19; aged 62.

Lewis, Roscoe C., Sayer, Pa.; Medico-Chirurgical College of Philadelphia, 1905; died September 5; aged 59.

Luttropp, Knut J., Boston, Mass.; Tufts College Dental School, 1891; died October 1.

Williams, J. H., Yakima, Wash.; North Pacific Dental College, 1918; died June 25.

ANNOUNCEMENTS

ANNOUNCEMENTS must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

CALENDAR OF MEETINGS

AMERICAN ASSOCIATION OF DENTAL SCHOOLS, Philadelphia, March 15-17.

AMERICAN ASSOCIATION OF ORTHODONTISTS, Chicago, Ill., May 13-16.

AMERICAN COLLEGE OF DENTISTS, Baltimore, March 17.

AMERICAN DENTAL ASSOCIATION, Cleveland, Ohio, September 9-13.

AMERICAN PUBLIC HEALTH ASSOCIATION, Detroit, Mich., October 8-11.

CHICAGO DENTAL SOCIETY MIDWINTER MEETING, February 12-15.

CLEVELAND DENTAL SOCIETY, April 8-9.

DENTAL CENTENARY, Baltimore, Md., March 18-20.

DENVER (COLO.) DENTAL ASSOCIATION, Denver, January 7-10.

DISTRICT OF COLUMBIA DENTAL SOCIETY, second and fourth Tuesdays in each month from October to June at the United States Public Health Service Auditorium, Washington.

FIVE STATE POST GRADUATE CLINIC, Washington, D. C., May 19-23.

GREATER PHILADELPHIA ANNUAL MEETING, January 30-February 2.

SOUTHWESTERN SOCIETY OF ORTHODONTISTS, Houston, Texas, February 18-21.

OMICRON KAPPA UPSILON, Philadelphia, March 15.

STATE SOCIETIES

January

Rhode Island, at Providence (17-18)

February

Minnesota, at St. Paul (27-29)

April

Alabama, at Birmingham (9-11)
Arizona, at Tucson
Kansas, at Kansas City, Mo. (28-May 1)
Kentucky, at Owensboro (11-13)
Louisiana, at Monroe (18-20)
Massachusetts, at Boston (22-25)
Michigan, at Detroit (15-17)
Mississippi, at Jackson (15-17)
Missouri, at Kansas City (28-May 1)
Oklahoma, at Tulsa (14-16)
Texas, at Dallas (9-11)
Wisconsin (22-25)

May

Arkansas, at Little Rock (20-22)
California State, at Oakland (13-15)
District of Columbia, at Washington (19-23)
Georgia, at Macon (14-16)
Illinois, at Springfield (13-16)
Indiana, at Indianapolis (20-22)
Iowa, at Des Moines (6-8)
Montana, at Billings (2-4)
Nebraska, at Lincoln (20-23)
New Jersey, at Asbury Park (8-10)
New York, at Buffalo (14-17)
North Carolina, at Charlotte (6-8)
North Dakota, at Bismarck (5-7)
South Carolina, at Spartanburg (20-21)
South Dakota, at Sioux Falls (12-14)
Tennessee, at Memphis (13-16)
Vermont, at Burlington (15-16)
Virginia, at Lynchburg (13-15)
West Virginia, at Charleston (20-22)

June

Colorado, at Colorado Springs (20-22)
Connecticut, at New London (5-7)
Idaho, at Sun Valley (23-25)
Maine, at Lakewood (23-25)
Nevada, at Reno (8)
New Hampshire, at North Conway
New Mexico, at Santa Fe
Oregon, at Portland (12-15)
Pennsylvania, S. S. South American (13-16)
Utah, at Salt Lake City
Wyoming, at Rock Springs

August

Hawaii, at Honolulu

October

Southern California, at Los Angeles

November

Ohio, at Cincinnati

GEORGIA DENTAL ASSOCIATION

THE seventy-second annual meeting of the Georgia Dental Association will be held at Macon, May 14-16, with headquarters at the Hotel Dempsey.

R. H. MURPHY, *Secretary,*
920 Ga. Cas. Bldg.,
Macon.

MISSISSIPPI DENTAL ASSOCIATION

THE next meeting of the Mississippi Dental Association will be held at Jackson at the Robert E. Lee Hotel, April 15-17.

GEORGE P. EVANS, *Secretary,*
Jackson.

PENNSYLVANIA STATE DENTAL SOCIETY

THE Seventy-Second Annual Meeting of the Pennsylvania State Dental Society will be held aboard the S. S. American of the Georgian Bay Line, June 13-16, from Erie, Pa.

C. J. HOLLISTER, *Secretary,*
217 State St.,
Harrisburg.

RHODE ISLAND STATE DENTAL SOCIETY

THE Rhode Island State Dental Society will hold its next annual meeting January 17-18 at the Biltmore Hotel, Providence.

EDWARD C. MORIN, *President,*
188 Main St.,
Pawtucket.

FIVE STATE POST GRADUATE CLINIC

THE Eighth Annual Five State Post Graduate Clinic of the District of Columbia Dental Society will be held May 19-23, at the Willard Hotel, Washington.

DAVID J. FITZGIBBON, *Chairman,*
Publicity Committee,
1801 Eye St.,
Washington.

AMERICAN ASSOCIATION OF DENTAL SCHOOLS

THE Seventeenth Annual Meeting of the American Association of Dental Schools will be held in Philadelphia, March 15-17, with headquarters at the Benjamin Franklin Hotel.

G. D. TIMMONS, *Secretary,*
Indiana University School of Dentistry,
Indianapolis, Ind.

AMERICAN COLLEGE OF DENTISTS

THE American College of Dentists is sponsoring a full day program for March 17 at the Belvedere Hotel, Baltimore. In the evening, a special convocation of the college will be held. The meeting throughout the day is open to the profession.

O. W. BRANDHORST, *Secretary,*
4952 Maryland Ave.,
St. Louis.

SOUTHWESTERN SOCIETY OF ORTHODONTISTS

THE Nineteenth Annual Meeting of the Southwestern Society of Orthodontists will be held at the Rice Hotel, Houston, Texas, February 18-21.

R. E. OLSON, *Secretary,*
1001 Union National Bank Bldg.,
Wichita, Kan.

CLEVELAND DENTAL SOCIETY

THE Annual Spring Clinic Meeting of the Cleveland Dental Society will be held April 8-9 at the Statler Hotel.

IRWIN F. STEUER, *Chairman,*
Publicity Committee,
562 Rose Bldg.,
Cleveland, Ohio.

DENVER DENTAL ASSOCIATION

THE Denver Dental Association will hold its thirty-third annual Rocky Mountain Midwinter Meeting, January 7-10, at the Shirley Savoy Hotel, Denver, Colo.

ALBERT P. HORTON, *Director,*
206 Metropolitan Bldg.,
Denver.

DENTAL CENTENARY CELEBRATION

THE one hundredth anniversary of the founding of professional dentistry will be celebrated in Baltimore, Md., March 18-20.

MEYER EGGNATZ, *Secretary,*
Medical Arts Bldg.,
Baltimore, Md.

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS OF THE NAVY

A COMPETITIVE examination to select not

more than twenty for appointment in the Dental Corps of the Navy will be held on January 9, at the Naval Medical School, Washington, D. C., Naval Training Station, Great Lakes, Ill., and Naval Training Station, San Diego, Calif. A candidate for appointment in the Dental Corps must be a citizen of the United States and must be between 21 and 32 years of age at the time of appointment, a graduate of a standard dental college, of good moral character and of unquestionable professional repute. Credentials relative to character, citizenship, date of birth and education must be submitted and approved before an applicant can be authorized to appear for examination.

A circular which contains full information relative to the Dental Corps and describes the method of making application for appointment can be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS, REGULAR ARMY

An examination for the selection of candidates for appointment in the Dental Corps, Regular Army, will be held February 12-17, 1940, including both physical and professional examinations. The latter, consisting of written, oral and clinical tests, is open to male citizens of the United States between the ages of 22-9/12 and 31-9/12 years at the time of the examination, who are graduates of acceptable dental schools and who have had at least 1-11/12 years subsequent practice in their profession.

Candidates who have failed in more than one previous examination for appointment in the Dental Corps, Regular Army, will not be permitted to undergo examination again.

Full information and application blanks will be furnished upon request to The Adjutant General, War Department, Washington, D. C. Applications will not be considered after January 27, 1940.

BRONX HOSPITAL INTERNSHIP

The Bronx Hospital will hold an examination for dental internship December 26, 8 p.m. Internship is for one year beginning July 1. The Bronx Hospital is a modern hospital with a bed capacity of 310, for acute diseases. The hospital has a very active outpatient department in all branches of dentistry, including periodontia, exodontia, anesthesia, oral surgery, orthodontia, radiography and operative dentistry. Hospital interns assist at oral surgical procedures under the supervision of attendants in oral surgery at the hospital, for intern cases.

Write for application to the superintendent of the hospital, Fulton Ave. at 169th St., Bronx, N. Y.

TESTIMONIAL DINNER

The First District Dental Society of the State of New York will tender Dr. Arthur H. Merritt a testimonial dinner, February 21, at the Hotel Pennsylvania. Further announcement will be made in the February issue of The Journal.

Waldo H. Mork, *Chairman,*
2 E. 103d St.,
New York, N. Y.

OMICRON KAPPA UPSILON

The Twenty-Fifth Anniversary Meeting of Omicron Kappa Upsilon will be held in conjunction with the annual meeting of the American Association of Dental Schools, Philadelphia, March 15, at the Benjamin Franklin Hotel.

G. W. Teuscher, *Secretary,*
311 E. Chicago Ave.,
Chicago.

PSI OMEGA LUNCHEON

A Psi Omega luncheon will be held under the auspices of Oriole Alumni Chapter at the time of the Dental Centenary in Baltimore; March 18, 12:30 p.m., at the Emerson Hotel. Psi Omegas will please register during the meeting in Room 327, Hotel Emerson.

James H. Ferguson, Jr.,
Grand Master,
National Alumni Chapter,
Medical Arts Bldg.,
Baltimore, Md.

PENNSYLVANIA STATE DENTAL HYGIENISTS' ASSOCIATION

The Pennsylvania State Dental Hygienists' annual meeting will be held in Philadelphia, January 30-February 2, at the Benjamin Franklin Hotel.

Gertrude Kaar,
6904 N. Broad St.,
Philadelphia.

AMERICAN PUBLIC HEALTH ASSOCIATION

THE Sixty-Ninth Annual Meeting of the American Public Health Association will be held in Detroit, Mich., October 8-11, with headquarters at the Book-Cadillac and the Statler hotels.

WILLIMINA RAYNE WALSH,
Associate Secretary,
50 W. 50th St.,
New York, N. Y.

UNITED STATES PATENTS APPLICABLE OR PERTAINING TO DENTISTRY ISSUED DURING NOVEMBER 1939

November 7

No. 1,178,663, to LAURENCE E. HARRISON. Package of reversible thermoplastic impression composition.

No. 2,178,717, to GEORGE HENRY BURTENSHAW. Denture demonstrating device.

No. 2,178,800, to CHARLES F. LOMBARD. Inhaler.

No. 2,178,821, to WILLIAM G. TURNER. Tooth filling.

No. 2,179,266, to EMERY D. LUKENBILL. Grip attachment for brush handles.

No. 2,179,402, to BERNARD DORAN. Elastic toothbrush.

November 14

No. 2,179,502, to REINER W. ERDLE. Retention means for artificial teeth gum sections and the like.

No. 2,180,249, to JACK MORTIMER LEMPERT. Dentist's saliva ejector.

November 21

No. 2,180,375, to FRANK S. TRUSLER. Clamp for dental flasks.

No. 2,180,499, to HAROLD H. BEARDSLEY. Contra-angle dental handpiece.

No. 2,180, 522, to ISABELLE HENNE. Dental floss throw-away unit and method of making same.

No. 2,180,549, to CHARLES H. PRANGE. Denture.

No. 2,180,673, to MARIO GALETTI. Articulator.

November 28

No. 2,181,465, to BERTHOLD SCHNEIDER. Chair for doctors, dentists, hairdressers and the like.

No. 2,181,474, to HERBERT R. BERGER. Mandrel and polisher for polishing and grinding devices.

No. 2,181,694, to FRED R. FELCHER. Method of making artificial teeth.

No. D-117,807, to HARRY C. GOWRAN. Design for a dentist's cabinet or the like.